JUNE 10, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Which Way Now?

The Beck scandal's effects . . . page 99

✔ Superforming with Explosives . . . page 142

✔ Galvanizing Goes Continuous . . . page 245

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No Wonder this EC&M Magnet

DOES THE JOB BETTER!

EC&M Type SW All-Welded Lifting Magnets have a new look ...inside as well as outside! They're stronger and better designed to withstand the hard knocks encountered in magnet operation. They're easier to maneuver. And through high-lifting capacity they reduce handling costs.

The magnet-coil is wound between turns with purer, thinner asbestos tape. Its strength has been increased by impregnation with EC&M No. 281 compound. Between layers is a new insulation product, ECAMICA board, which is moisture-free, has high dielectric strength and excellent mechanical ability. A new fabricating process locks the windings against movement.

EC&M magnets are ALL-WELDED to keep pole shoes tight, to keep moisture out, to increase the efficiency of the magnetic circuit and to prolong magnet life.

Write for Bulletin 900

THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY

CLEVELAND 28 • OHIO

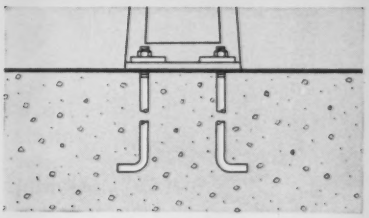
7408

Where Do All the Anchor Bolts Go?

Something the motorist never sees, and hardly ever thinks about, are the long hook bolts which, in their unobtrusive way, anchor the electric light standards found along boulevards and highways. The bolts, generally used in groups of four, are embedded in concrete, where they provide adequate anchorage indefinitely.

Nor are hook anchor bolts limited to this one use. They also anchor transmission towers and bridges, and support signs at service stations and parking areas; they fasten structural steel to concrete foundations, and machinery to factory floors. We turn them out in a wide range of styles: all diameters from ¼ in. to 4 in., and in almost any length.

A highly specialized product, Bethlehem hook anchor bolts are representative of the ability of our fastener plant at Lebanon, Pa., to produce just about any type of headed or threaded fastener imaginable. Our fasteners engineers have a vast backlog of experience in handling the unusual in fastener problems—that's why they are frequently able to come up with solutions which add up to a saving for the user.



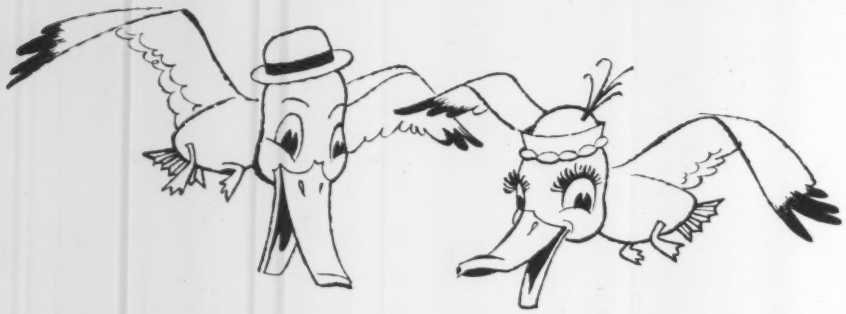
If you have a fastener problem which has been causing difficulty, we suggest you put it up to our fasteners engineers. Just drop a line to the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

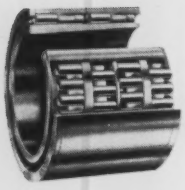
BETHLEHEM STEEL



Production is smooth as water rolling off your back!

No wonder: **SKF**® has developed a roll neck mounting that meets the demands for higher speeds, closer gauge tolerances, better quality and heavier rolling loads. This multi-row has the features desired by every mill man – most usable capacity in a given space... easy to assemble and disassemble... uses oil or grease, even at high finishing stand speeds.

When you install a new mill, make sure it is equipped with **SKF** multi-row cylindricals. Or have an **SKF** engineer explain how your present mill can be changed over at minimum cost to eliminate roll neck troubles such as breakage, scuffing, excessive bearing failures or high maintenance time and cost. 7737



SKF

EVERY TYPE—EVERY USE

- *Ball Bearings*
- *Cylindrical Roller Bearings*
- *Spherical Roller Bearings*
- *Tapered Roller Bearings* ("Tyson")

* Reg. U.S. Pat. Off. Tyson Bearing Corporation

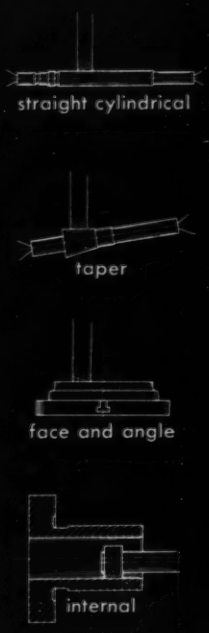
SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

Low cost grinding of small parts... Landis Grindwell general purpose cylindrical grinder

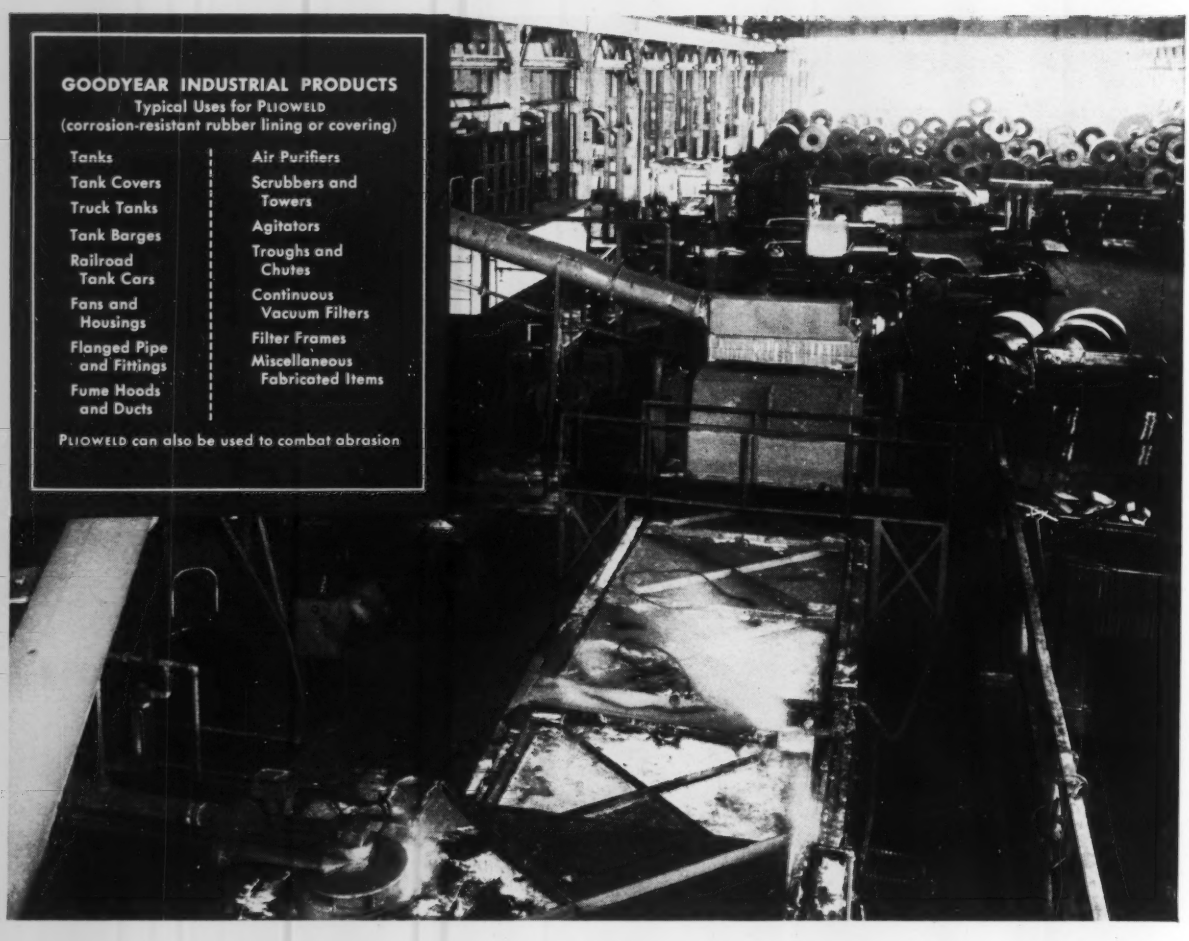
for:
manufacturing
maintenance
toolrooms
training

here's how you save:
low first cost
quick change of setup
high precision
simplified maintenance

typical grinding operations



LANDIS
precision grinders
LANDIS TOOL COMPANY / WAYNESBORO, PENNA.



These rubber-lined tanks pickle with an underwater flame

A UNIQUE new way to heat pickling tanks—with an open flame actually submerged in the pickling solution itself—promised important new economies at this Midwestern steel plant. But they were solidly sold on rubber-lined tank advantages. And in such tanks, the new system had been tried at other plants—and had failed.

Then they called in the G.T.M.—Goodyear Technical Man—and gave him the problem. After careful study, he and his colleagues designed and engineered tanks that make the most moneysaving use of underwater firing. Key to their success was the use of PLIOWELD Tank Linings—especially compounded to stand up under the concentrated acids and high temperatures.

In just over a year, *these tanks processed 1,000,000 tons of steel—are still in perfect condition—have brought the company important savings.* And that's just one more example of the way the G.T.M. provides effective answers to vital production problems—with extra-quality products. To cash in on this unique ability, contact him by writing: Goodyear, Industrial Products Division, Akron 16, Ohio.

PLIOWELD TANK LININGS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Plioweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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The Metalworking Weekly

June 10, 1957
Vol. 140 No. 23

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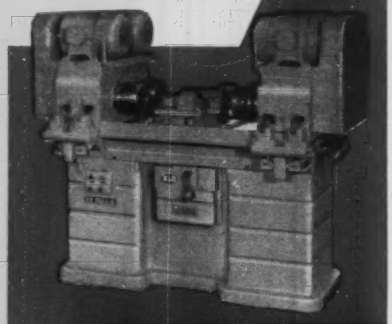
Index available semiannually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

MAXIMUM PRODUCTION AT LOW COST!



This Ex-Cell-O Style 1212-B Double-End Boring Machine practically *doubles production* when loading time of parts approximates the time of machining.

Precision and versatility are built into every Ex-Cell-O Boring Machine—the minute you put one to work your profits go up! All standard models are easily equipped for automatic production at minimum cost.

● **STYLE 2112-B SINGLE-END:** For work pieces in the small and medium-size range. Flexible hydraulic controls give easy adjustment of work cycle.

● **STYLE 112-D:** With long stroke for medium and heavy work requiring precision production.

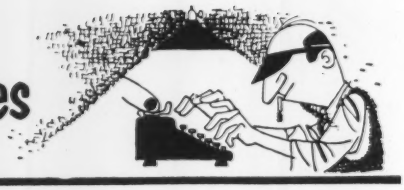
● **STYLE 17-A:** Massive construction to maintain highest precision at production speed. Economical and easily tooled for a wide range of jobs.

XLO *EX-CELL-O FOR PRECISION*

57-42

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

behind the scenes



Toot! Toot!

A horn is the name of a large family of wind instruments, so if you blow a horn you are, in effect, blowing a lot of wind; and if you blow a lot of wind, who's going to take you seriously? Well, we find ourselves in a spot where we are simply bursting to blow our own horn—and before our natural modesty rises to prevent us from blasting the good news, here it is:

In the 19th Annual Editorial Competition put on by *Industrial Marketing*, a plaque was awarded to STEEL for the best original research (Metal Selector, Oct. 1, 1956); a certificate for the best graphic presentation (cover design); and a certificate for the best series of articles (Program for Management, ten articles, February to November, 1956).

Machine Design, another Penton publication (regarded by many as one of the more handsome and erudite publications in the business paper field), won a certificate for its series of articles on "Dimensional Control in Design." Since the first contest in 1938, STEEL has won 24 awards, topping all other publications. *Machine Design* is second, with 22.

Whither Labor, Homos?

In STEEL's widely read Metalworking Outlook pages, a paragraph appeared last week under the heading "Labor Tightens Up." This week—after a gestation period of seven days —the item re-appears as a full-blown story, rating a cover as well. It could be called "Whither Labor?" (page 99).

"How now?" we inquired of Associate Managing Editor John Morgan. "Have we inadvertently stumbled on your feature mine? Do you pinch stories from your own pages? What's with this 'Whither Labor?' stuff?"

Honest John (he earned the nickname from his admiring comrades in arms 12 years ago at the liberation of Dachau, when he proudly rejected a German bribe of a slightly used lamp shade) declined to reveal his sources. "I'll tell you this, however," he said. "Labor is doing a lot of work inside its own organization. After the Beck affair, it was, like Elvis Presley, all shook up. Now it is strengthening its ranks, shaping up new programs, consolidating its gains."

"You're not really going to call it 'Whither Labor?' are you?"

"No; you called it that. Anyway, what's wrong with 'whither'?"

"Oh, that; we had to struggle through a high school commencement speech one time, something about 'Whither now, oh, puers and puellas?' and now the word gives us the hiccoughs."

"Hiccoughs, haeccoughs, hoccoughs." Mr. Morgan murmured dryly. "There are times when I wonder how you ever got out."

"Out of high school?"

"No—out of your cage."

June Nights & Roses

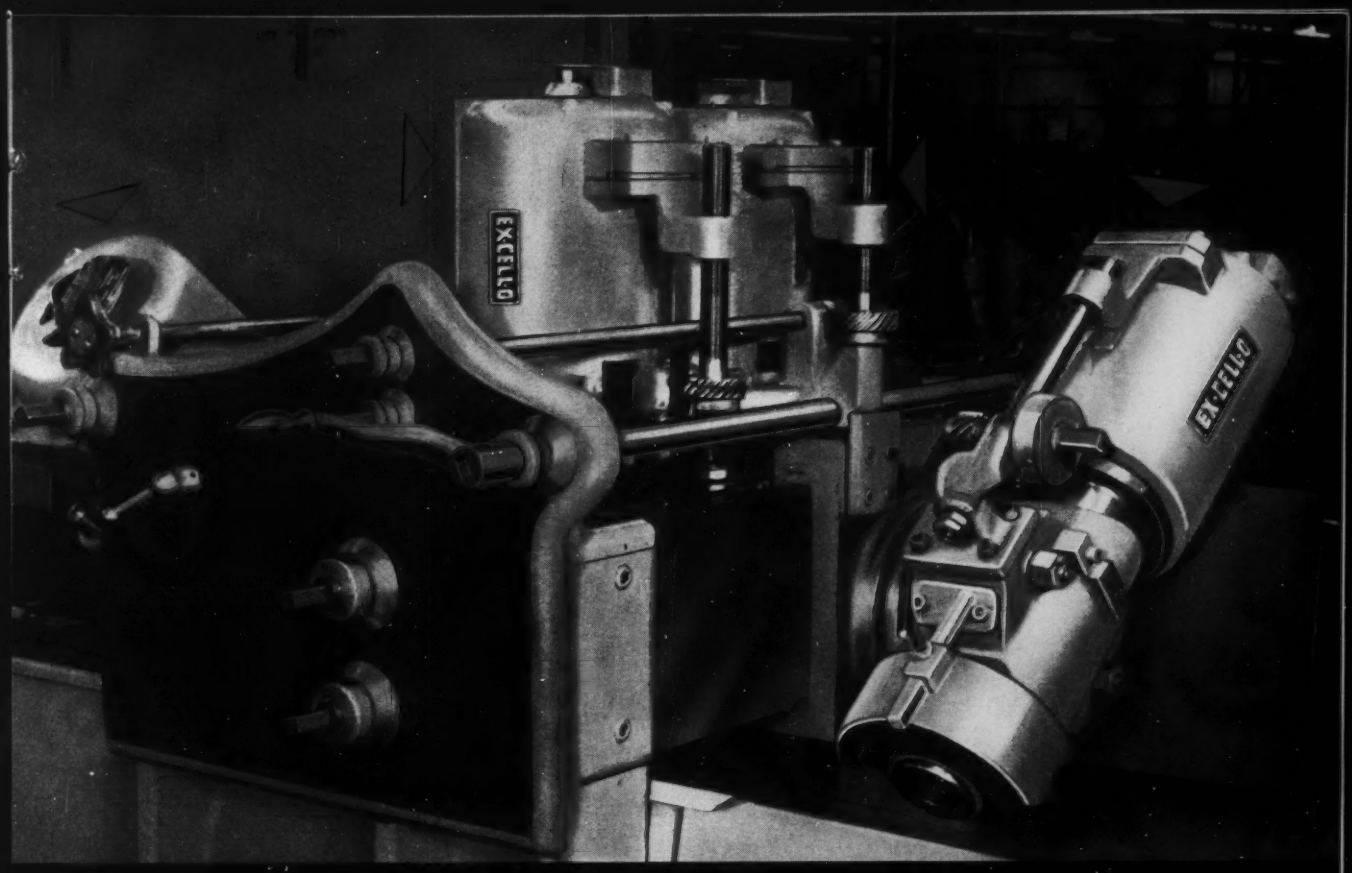
Giuseppi Lorenzo d'Ghisa
Wouldn't climb up the Tower of Pisa.
"I'm-a no big deceiver:
I'm-a gotta rose fever,
And da tower will shake when I sneeze-a."

Meet the Folks

The answer to the lamiced puzzle, naturally, was rallod, and we're sorry we ever brought it up. Here's one to cheer you when you begin to question the wisdom of Providence in the matter of acquiring in-laws: Just stop a moment and figure how many of your *own* folks might be tagging around if death had taken a holiday since the beginning of the Christian era—about 64 generations ago. In that time, assuming that you had two parents, four grandparents, eight great grandparents, etc., and not allowing for divorce or overproduction, about how many lineal relations did you have? Now, assuming that your wife had the same number, (a sobering thought, friends!) can you imagine a complete family get-together, say for a 4th of July picnic? Whither might such an affair be held?

Shrdlu

(Metalworking Outlook—p. 93)



This Idea Multiplied Production by Two...

EX-CELL-O SPINDLES— AN INGENIOUS APPLICATION

A machinery builder in Kalamazoo, Michigan was faced with the problem of finish grinding both flat and angular dovetail ways on the column, knee and table of his vertical milling machines. Surface lengths varied from 9" to 24"; tolerances on flat and parallel measure had to be within .001" in 24". Workpieces were gray iron sand castings.

Conventional way to do the job—an oscillating surface grinder to work each dovetail separately. Production men thought they could improve on convention. They built up their own machine from an old planer bed, added a bridge to support four Ex-Cell-O Precision Spindles and retained the standard planer feed.

The result: grinding both sides of four dovetail surfaces in one-pass planer fashion for a saving of roughly 50 percent in per unit cost. Perhaps you too have an operation which could be performed more economically by an Ex-Cell-O Spindle; or perhaps you simply want to use the most versatile, dependable and long-lived spindle money can buy. In either case, you'll want to get in touch with your nearby Ex-Cell-O Representative, or contact Ex-Cell-O direct.

57-23

Above, four standard Ex-Cell-O Precision Grinding Spindles are utilized to grind four surfaces of machine ways in one pass.

Standard, totally enclosed motorized surface grinder spindle is rated one horsepower at 3600 rpm. Also available in a range of higher horsepower.

XLO EX-CELL-O FOR PRECISION

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

STAINLESS STEEL MAKES THE DIFFERENCE

...its effect on modern plane construction

Stainless steel honeycomb is bonded between thin sheets of stainless steel to combine strength with lightness.

With this new construction, designers form rear nacelles, struts, underwing area panels, ailerons and rear fuselage panels near the "hot" zone of the inboard engine as well as other key points.

For more information about stainless steel and the contribution it can make to your design or marketing problems, see your stainless steel supplier or write ELECTROMET—leading producer of over 100 alloys for the metal industries, including chromium and manganese for making stainless steels. ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

METALS DO MORE ALL THE TIME ...THANKS TO ALLOYS

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FERRO-ALLOYS AND METALS

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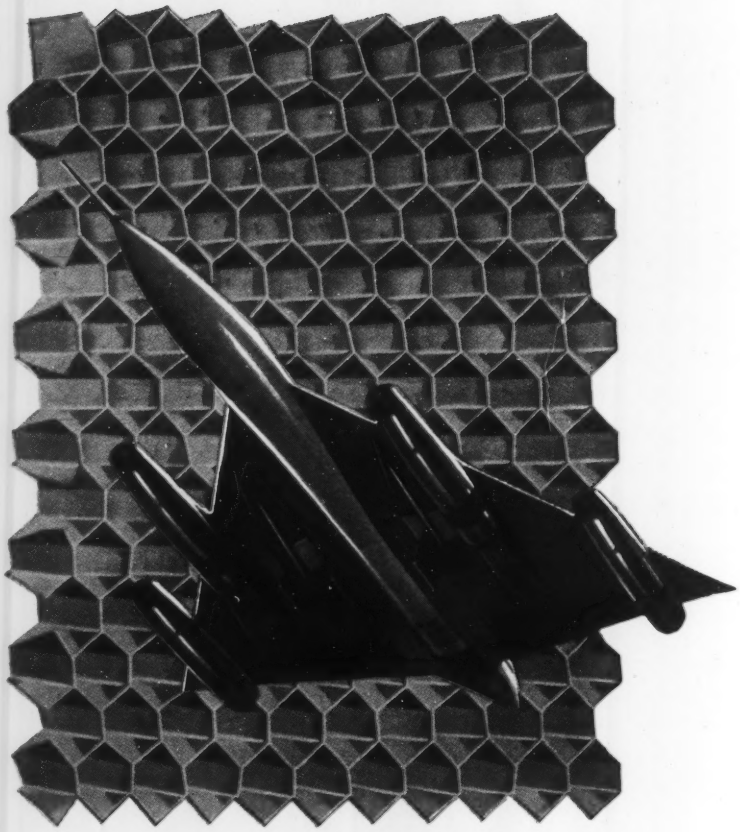
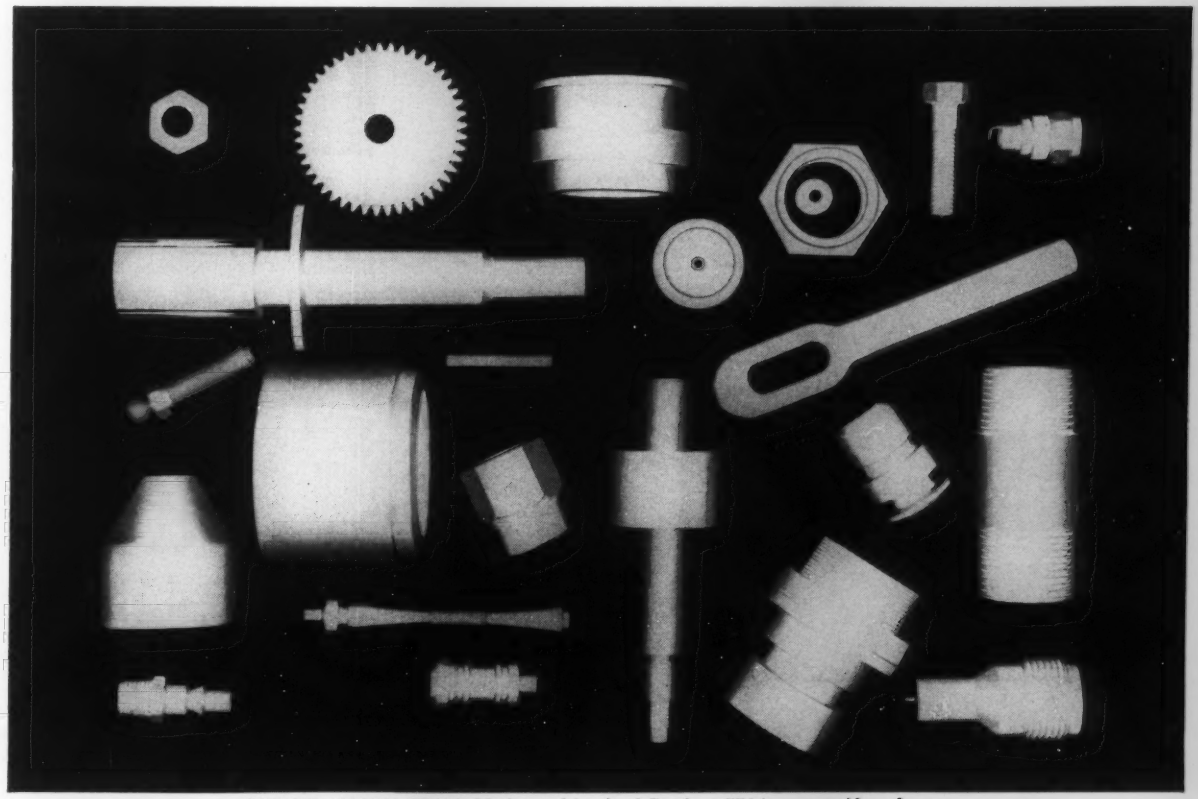


The new B-58 Hustler gets its strength with light-weight stainless steel in new honeycomb construction! This design combines rigidity with resistance to heat and corrosion.

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.



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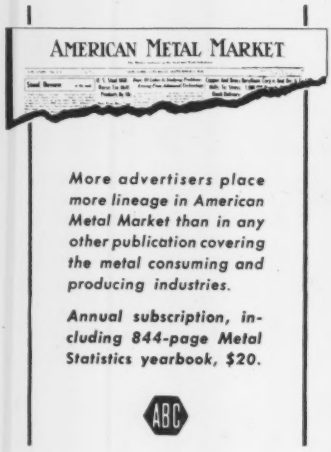

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LETTERS TO THE EDITORS

Stimulating, Helpful Articles

We would appreciate receiving six copies of the article, "Inventory Management" (May 13, page 109), No. 4 in your 1957 Program for Management. We are finding these articles stimulating and helpful.

H. J. Miller
General Manager
Speed-D-Burr Corp.
Glendale, Calif.

Congratulations on this fine article. May we have ten copies for management use?

M. L. Cowan
Materiel Manager
Librascope Inc.
Glendale, Calif.

Answer to Equipment Problem

I would like two copies of the article, "Atmosphere Control" Part I (May 20, page 138) and Part II (May 27, page 96). I have been looking for equipment of this nature for some time.

Harold K. Weiss
Material & Process Section
Television Picture Tube Division
Sylvania Electric Products Inc.
Seneca Falls, N. Y.

Squeeze Put on BDSA

It was a real pleasure to read your excellent article and analysis, "BDSA Fights Budget Cut" (Apr. 22, page 51). I personally feel your article will be a leading factor in restoring some of the BDSA budget, a problem that you so capably brought to the industry's attention.

Al Minetti
Consultant
Arlington Towers
Arlington, Va.

Impressed with Selector

I was impressed with the Welding Electrode Selector published in your Apr. 1 issue. I would appreciate a copy.

Robert E. Casick
Champion Rivet Co.
East Chicago, Ind.

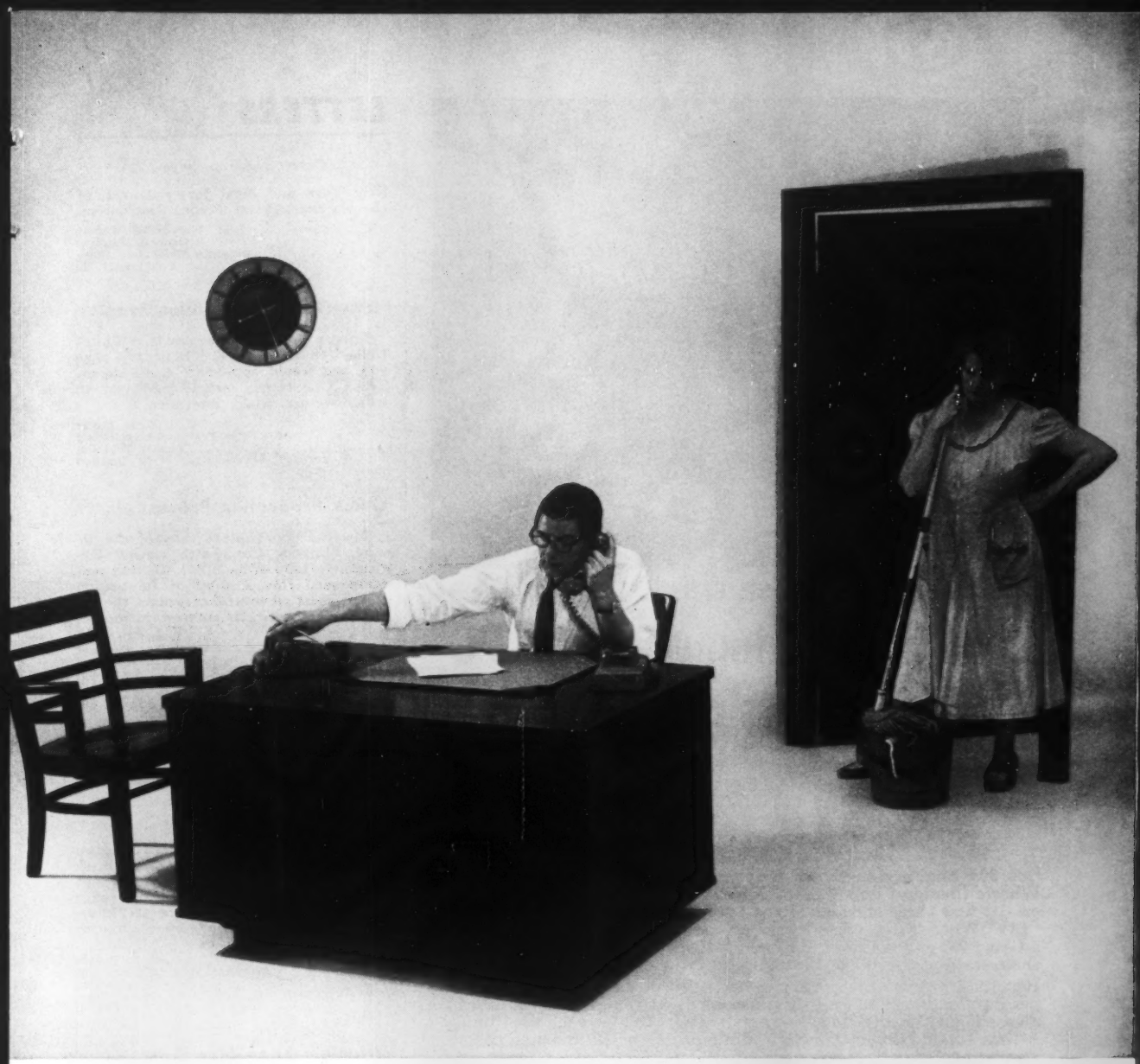
Engineers Seek Reprints

Several of our engineers have expressed interest in your article, "Today's Hottest Question: Materials for Use Above 1500°F?" (May 13, page 120). We would appreciate three reprints.

G. F. Sherman
Advertising Manager
Taylor Forge & Pipe Works
Chicago

Please send 25 reprints. I would like to use them at the next meeting of the

(Please turn to page 12)



Cracked shaft in Valdosta... His job: get a new one down to Georgia by tomorrow noon. It's an emergency case, but it's not as tough as it sounds.

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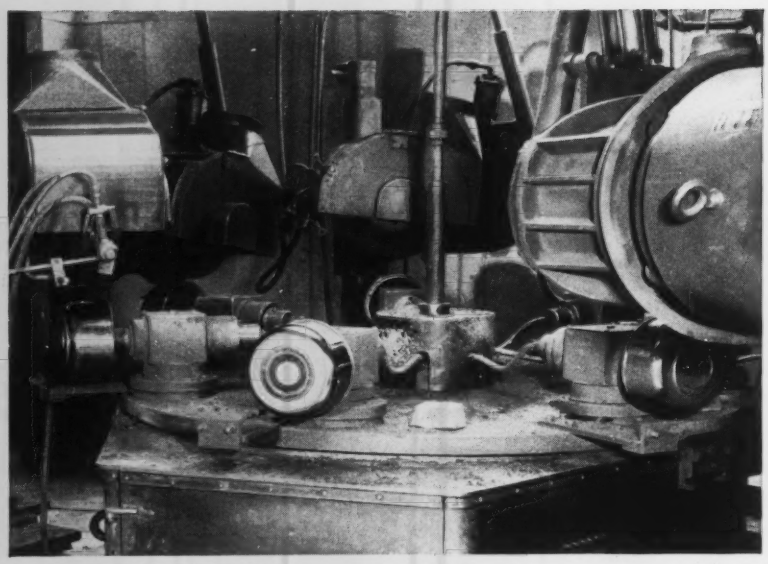

DORMEYER Corporation finds...

Automatic finishing with 3M "PG" Wheels cuts costs 66%

Dormeyer Corporation, nationally known Chicago appliance manufacturer, was using sisal buffs on a six-station rotary automatic machine to finish their stainless steel mixing bowls. This method was expensive, with daily production averaging 2200 finished bowls, and many rejects.

A 3M Engineer suggested that this company install 3M "PG" Wheels (made of hundreds of pieces of die-cut coated abrasives) on the first three stations of the automatic machine; a Grit #280 "PG" Wheel at the first station, a Grit #320 at the second and a Grit #400 at the third, all lubricated with liquid tripoli. The last three stations remained color buffs.

Results: production increased nearly 25% to 2900 finished units per day, and rejects were eliminated! Each "PG" Wheel finishes an average of 50,000 bowls—compared to 1700 for each sisal buff—thus cutting down-time to a minimum. Over-all finishing costs were cut 66%.

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If you now have or are planning to install an automatic finishing operation, it will pay you to get full facts on the 3M "PG" Wheel. Call your 3M Representative today, or send the coupon below.

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PRODUCT OF 3M COMPANY RESEARCH

LETTERS

(Concluded from page 10)

New York and New Jersey branch of the National Metal Trades Association.

Warren W. Walker
General Manager
Graphite Metallizing Corp.
Yonkers, N. Y.

Union Target: 18 Million People

I have just read the article, "White-Collar Drive Falters" (May 20, page 95), and would appreciate three copies. This is a timely article and one in which we are vitally interested.

L. L. Payne
Asst. Vice President-Engineering
Hughes Tool Co.
Houston

Quick Production Process

I would appreciate a copy of the article, "Cutting Costs with Impact Extrusion" (May 6, page 85). Having recommended this method of fabrication to designers on several occasions, the article is of particular interest to me.

James C. Nokes
Producibility Engineer
Temco Aircraft Corp.
Dallas

We would appreciate 20 copies for our sales engineers.

R. E. Dahlberg
Advertising Manager
Verson Allsteel Press Co.
Chicago

Useful to Group

In the May 13 issue, there are two articles we would like two reprints of: "Stretching Engineering Talent" (page 70) and "Inventory Management" (page 109). Articles of this nature are interesting, informative and useful to our group.

C. E. Barber
Manager, Material Operations
Defense Engineering
Chrysler Corp.
Detroit

Titanium Know-How

Please forward a copy of the article, "Titanium Forming: 2.5 Million Lb of Experience." It was so ably presented in your May 20 issue (page 178).

J. A. Angelico
Engineering Department
Bossert Division
Rockwell Spring & Axle Co.
Utica, N. Y.

Steel Quality Standards

Your Apr. 22 issue contained an excellent article on steel quality entitled, "What Makes a Good Deep Drawing Steel?" (page 78). We would appreciate six reprints.

W. F. Langefeld
Director of Purchases
Maytag Co.
Newton, Iowa

This is an excellent article. Please send me two copies.

T. S. Washburn
Manager, Quality Control
Indiana Harbor Works
Inland Steel Co.
East Chicago, Ind.

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COLD FINISHED BARS

Direct from the largest tube mill in the West means you save time and you get what you specify. Pacific can provide seamless tubes in carbon, alloy and stainless steel, and electric resistance welded tubing in sizes up to 4 inches in diameter. If you require extra-long tubing, Pacific is equipped to cold draw straight lengths up to 58 feet long. Pacific tubes are "quality controlled" at every critical stage of manufacture to insure close tolerance, workability and long service life.

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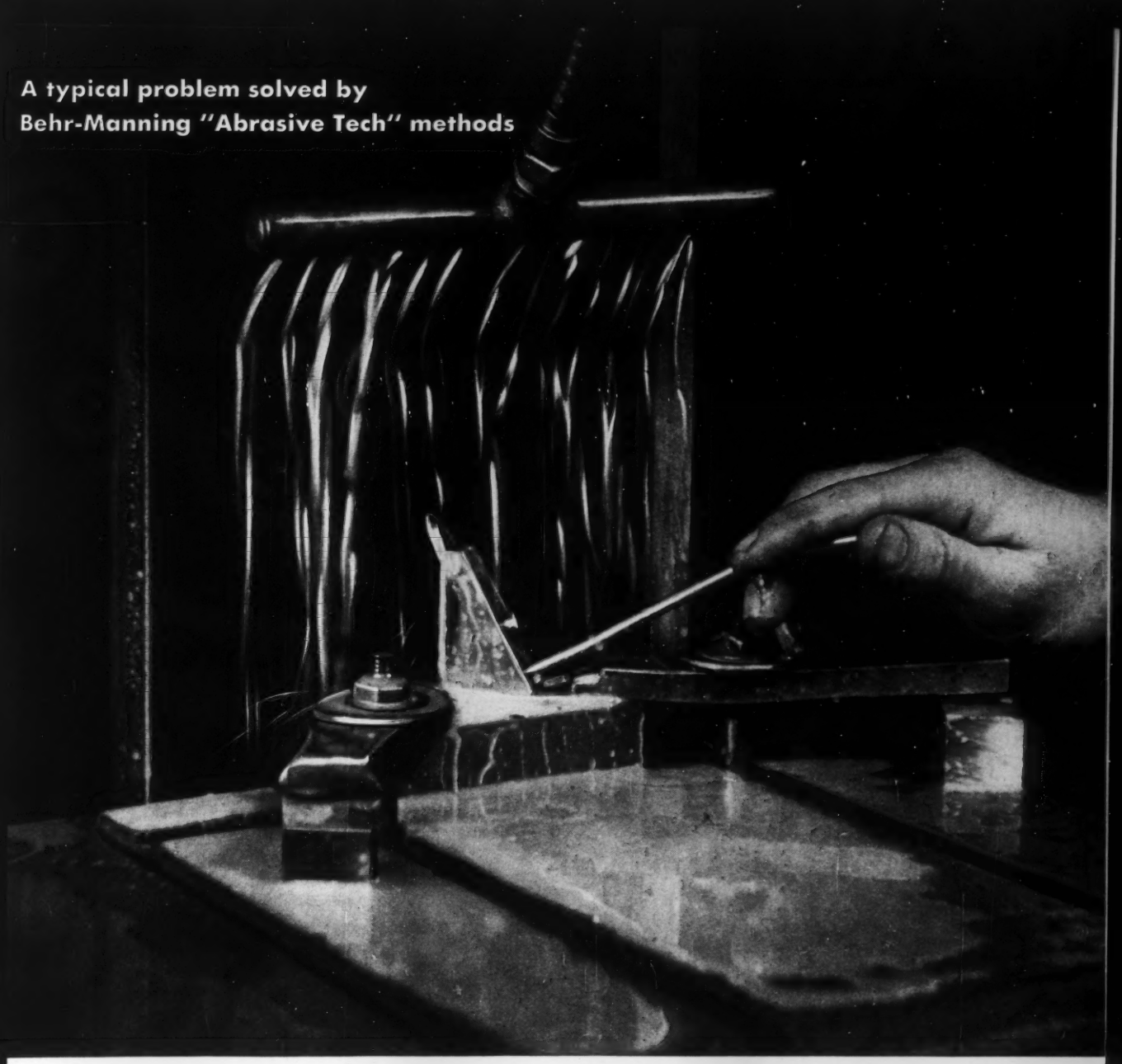
A typical problem solved by
Behr-Manning "Abrasive Tech" methods



30 minutes were cut to 18 seconds when this vertical platen belt grinder replaced a lathe in shaping boroscope mirrors. Cut at an angle from round bar stock, they need to have their bottom angle shaped to match the top angle, an operation accomplished by placing them in a fixture and rotating them against a moving Speed-wet Durite belt. This "Abrasive Tech" method is an example of the Behr-Manning technical service that may provide more production efficiency for your plant.

A Behr-Manning methods engineer can often give valuable aid in overcoming stubborn finishing problems. All you have to do is call the nearest Behr-Manning office. Seventeen well-equipped "Abrasive Tech" Methods Rooms are waiting to show you the newest techniques: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Grand Rapids, High Point, Indianapolis, Los Angeles, Teterboro, Camden, San Francisco, Seattle, St. Louis, and Brantford, Canada. Main office and plant: Troy, N. Y. For export: Norton Behr-Manning Overseas, Inc., New Rochelle, N. Y., U.S.A.

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BEHR-MANNING ®

You can expand your plant,

for production men

This Avey machine drills various patterns of holes in jet engine parts by changing program drums or by alternating two automatically-driven locators which position the table accurately from a radial position. Program drum also programs one or more of the four drilling units for drilling, reaming, and similar operations.

The machine consists entirely of standard Avey units: four Aveydraulic automatic units with 12″ feed; cast iron columns; 120″ fan type steel base; 60″ Electrodex table. Top column and unit have an in-and-out traverse of 20″. The ways are mounted on steel adaptor blocks which can be removed for different heights.

All units and the index table are push button-controlled.

If you're looking for flexibility in a special machine, your Avey man's the man to see.

for management

The pressure to expand is terrific on managements who want to be prepared for the rocketing market growth predicted for the next 10 years. They realize that they will probably lose ground by standing still, but they also want to protect their balance sheets, and their peace of mind, from heavy debt due to adding costly plant space.

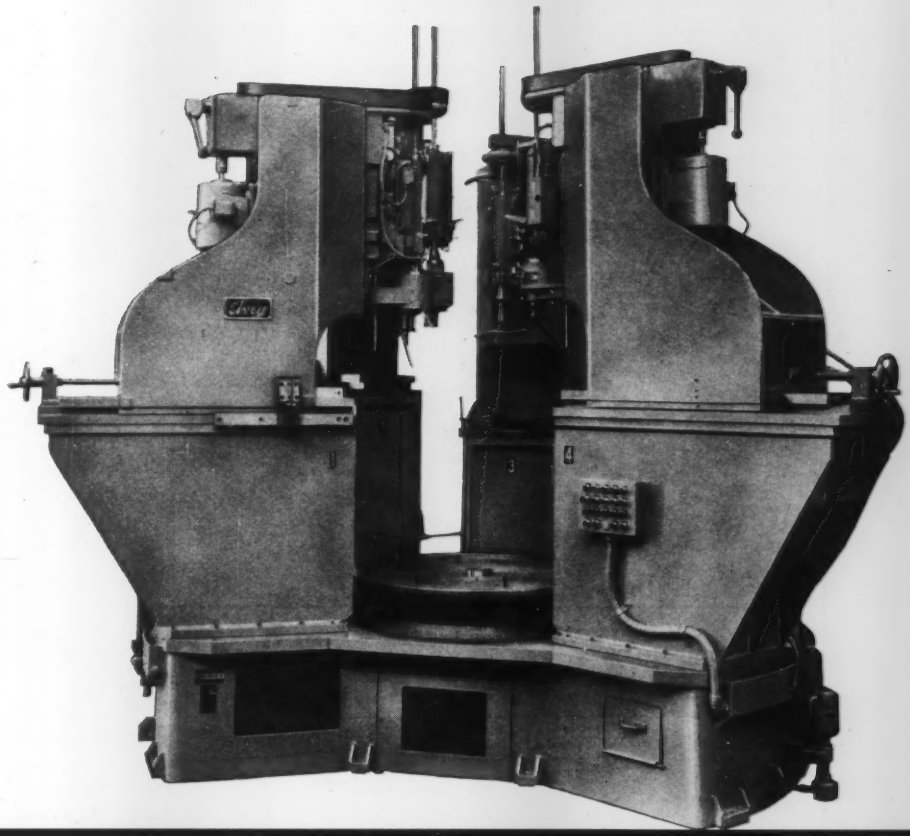
Avey production machines offer a quick and economical means of achieving the primary objective of expansion: increased productive capacity. They concentrate many operations in a comparatively small area, and free both floor space and labor for other productive operations. Their production rate enables you to increase your sales volume; and their fast pay-off rate gives you substantial earnings on your investment in a short time. Their unitized construction permits economical re-engineering to handle new parts or design changes.

AVEY DIVISION, THE MOTCH & MERRYWEATHER MACHINERY CO., BOX 625, CINCINNATI 1, OHIO

drilling, tapping, production machines

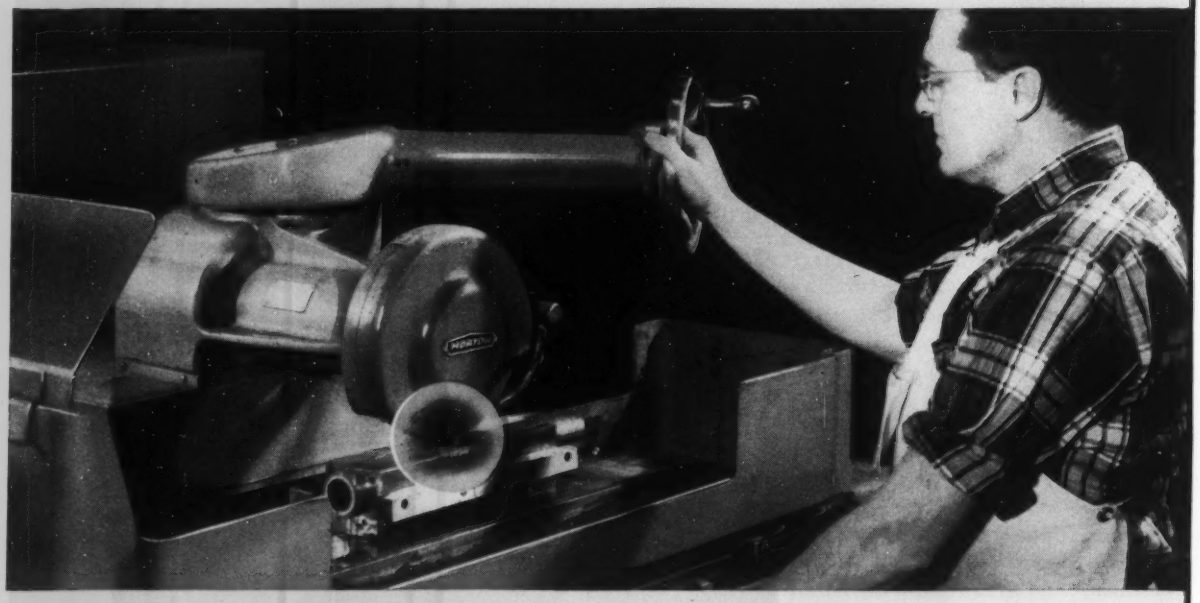
and sleep well too

Avey



With your surface grinders

ON BIG SURFACE GRINDERS, like Blanchards, Hanchetts, Mattisons, Thompsons and Hills, G BOND-32 ALUNDUM wheels bring you many "Touch of Gold" advantages. Such as cooler, faster cutting action . . . heavier cuts without burning . . . closer tolerances and smoother finishes . . . less dressing and more pieces per dressing . . . more work, and more kinds of work, per wheel.



ON SMALL SURFACE GRINDERS, including toolroom machines, G BOND-32 ALUNDUM wheels give you the same value-adding, cost-cutting benefits. They're ideal on grinding machines like Brown and Sharpes, Crystal Lakes, Deltas, Doalls, Gallmeyer and Livingstons, LaSalles, Reids, Sanfords, Taft-Peirces, Nortons and many others.

. . . TAKE DEEP COST CUTS

Norton G BOND-32 ALUNDUM wheels add the profit-boosting "TOUCH of GOLD" to any size machine*

W-1789

The Norton G Bond is the most efficient ever developed for precision and semi-precision grinding. It holds each abrasive grain just long enough for maximum cutting action, assuring a constant grinding surface of fresh, sharp cutting edges.

Norton 32 ALUNDUM abrasive is another big advancement in grinding progress — ideal for surface grinding requiring fast stock removal and heavy feeds.

Remember: only Norton offers you such long experience in both grinding wheels and grinding machines to help you produce more at lower cost. See your Norton Distributor for further facts on how the G Bond and 32 ALUNDUM abrasive combine to form the best "Touch of Gold" team for grinding high speed and alloy steels. (For other applications investigate other Norton ALUNDUM and CRYSTOLON* abrasives.) Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors all around the world.

NORTON

ABRASIVES

Making better products... to make your products better

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*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

"Aeroquip Hose with Reusable Fittings Makes Replacement Quick and Easy"

REPORTS: **Ed Reine, Whirlpool-Seeger Corp.**

When replacement hose lines are needed on the four automatic resistance welders at the company's Evansville, Ind. refrigerator plant, Whirlpool-Seeger maintenance personnel save time by using Aeroquip Bulk Hose and Reusable Fittings. Only bench tools are needed to make new assemblies. Three kinds of Aeroquip Hoses meet all plant requirements:

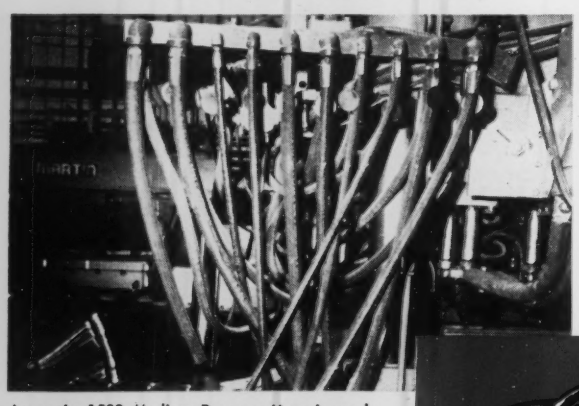
1503 Medium Pressure Hose with Reusable Fittings for hydraulic and lube oil applications.

1509 High Pressure Hose with Reusable Fittings for hydraulic lines.

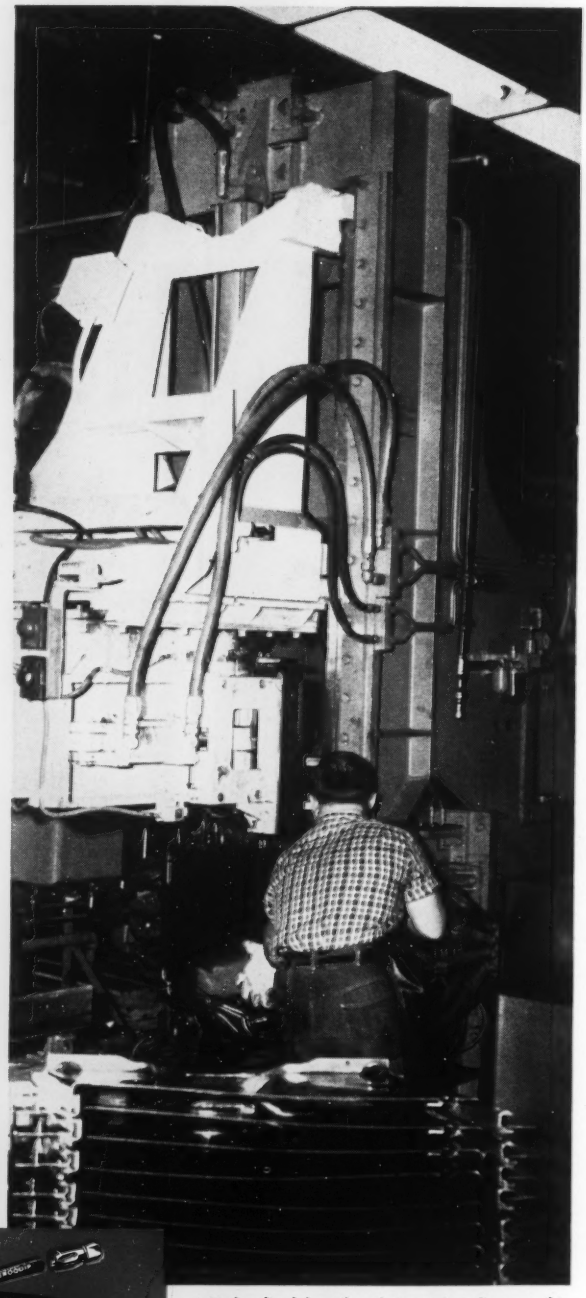
1525 Low Pressure Hose with *SOCKETLESS* Fittings for welding tip coolant lines.

Quick replacement is *just one of the many* advantages of Aeroquip Flexible Hose Lines. Learn about their dependability and durability from your Aeroquip Distributor listed in the Yellow Page Phone Book. Or write us.

SOCKETLESS is an Aeroquip Trademark



Aeroquip 1503 Medium Pressure Hose is used on these welder hydraulic and lube oil lines. Because it is flexible, Aeroquip Hose installs quickly and easily, withstands vibration.



Hydraulic, lube oil and tip coolant lines on this resistance welder are made from Aeroquip Hose and Detachable, Reusable Fittings.

Aeroquip

REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

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SOCKETLESS Fitting Patents: Argentina, Australia, Austria, France, Great Britain, Italy, Mexico, South Africa, Spain—Patents pending in U.S.A., Canada, and other countries.
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OF MEETINGS

June 11-13, Western Plant Maintenance & Engineering Show: Civic Auditorium, San Francisco. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

June 13-14, Malleable Founders' Society: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Society's address: 1800 Union Commerce Bldg., Cleveland 14, O. Executive vice president: Lowell D. Ryan.

June 14, Pressed Metal Institute: National sales conference for metal stampers, Carter hotel, Cleveland. Institute's address: 3673 Lee Rd., Cleveland 20, O. Managing director: H. A. Daschner.

June 14-16, Steel Kitchen Cabinet Manufacturers Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1008 Engineers Bldg., Cleveland 13, O. Executive secretary: Arthur J. Tuscany Jr.

June 16-17, National Association of Metal Finishers: Annual meeting, Sheraton-Mt. Royal hotel, Montreal, Que. Association's address: 60 Bently Rd., Cedar Grove, N. J. Secretary: P. Peter Kovatis.

June 16-20, American Electroplaters Society: Annual meeting, Sheraton-Mt. Royal hotel, Montreal, Que. Society's address: 445 Broad St., Newark 2, N. J. Secretary: John P. Nichols.

June 16-21, American Society for Testing Materials: Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

June 18-20, Triple Industrial Supply Convention: Mark Hopkins hotel, San Francisco. Information: W. B. Thomas, 2130 Keith Bldg., Cleveland 15, O.

June 19-21, American Marketing Asociation: Annual meeting and exhibit, Hotel Statler, Detroit. Association's address: 27 E. Monroe St., Chicago, Ill. Executive director: William C. Gordon Jr.

June 19-22, Drop Forging Association: Annual meeting, Grand hotel, Mackinac Island, Mich. Association's address: 419 S. Walnut St., Lansing 33, Mich. Secretary-treasurer: Richard Marcus.

June 20-23, American Coal Sales Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1625 Eye St. N.W., Washington 6, D. C. Executive vice president: W. W. Bayfield.

June 23-25, Alloy Casting Institute: Annual meeting, Homestead, Hot Springs, Va. Institute's address: 32 Third Ave., Mineola, N. Y. Executive vice president: E. A. Schoefer.

June 23-28, National Asociation of Power Engineers Inc.: Annual meeting and exhibit, Pantlind hotel, Grand Rapids, Mich. Association's address: 176 W. Adams St., Chicago 3, Ill. Secretary: Edward J. Schuetz.

June 24-25, Wire Reinforcement Institute Inc.: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 1049 National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

June 24-28, American Institute of Electrical Engineers: Summer general meeting, Sheraton-Mt. Royal hotel, Montreal, Que. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

June 24-29, Concrete Reinforcing Steel Institute: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 38 S. Dearborn St., Chicago 3, Ill. Managing director: H. C. Delzell.

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Engineering know-how and long experience effectively solve such casting problems as wide range of metal sections and tight dimensional tolerances. Hamilton Foundry's modern production processes build economy into your castings . . . better machinability . . . skin-smooth surface . . . consistent physical properties. In addition, a variety of irons provide unusual flexibility of property ranges to meet your specifications exactly.

Why don't you call Hamilton Foundry today?

The above Annealing Machine Bed (bottom view) weighs 41 lbs. with a thin metal section of ½" up to 10"

HAMILTON QUALITY CASTINGS

GRAY IRON
ALLOYED IRON
MEEHANITE®
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H57-4

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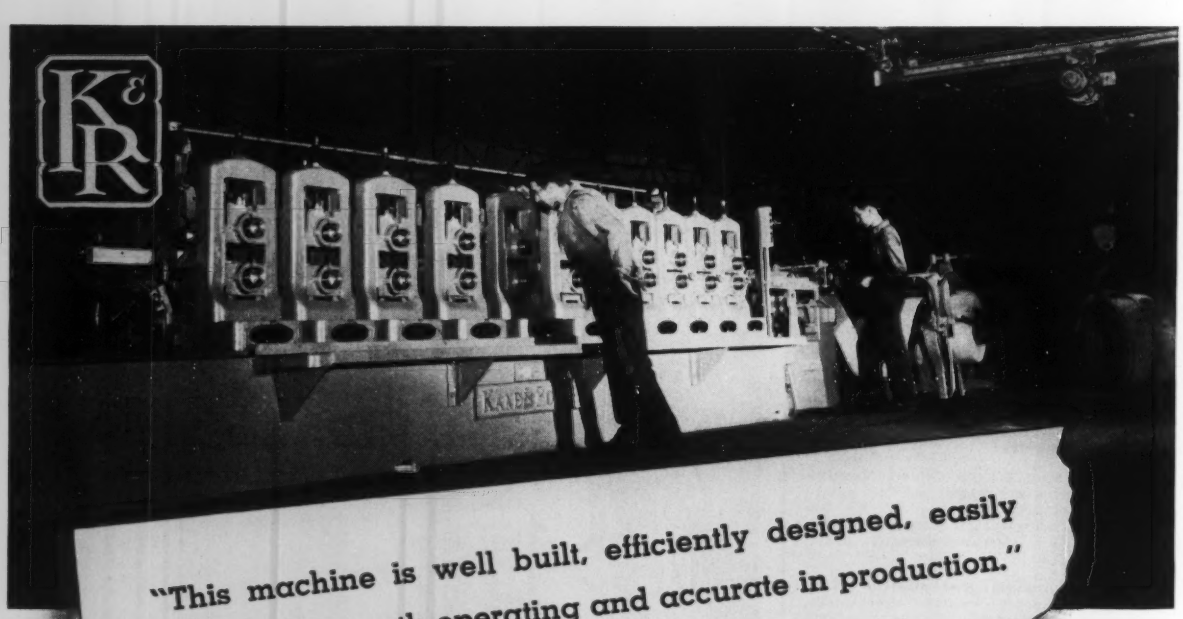


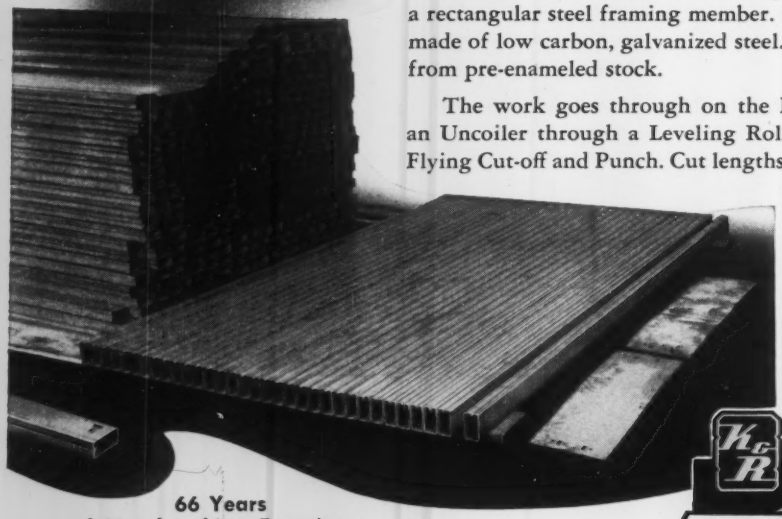
"This machine is well built, efficiently designed, easily adjusted, smooth operating and accurate in production."

writes Mr. W. F. Hinkle, Director, Engineering Division, Acme Steel Co.

ACME STEEL

Yes, Mr. Hinkle is perfectly satisfied to stamp "Acme Steel" on products rolled on a K&R Cold Roll Forming Machine. The section rolled here is a rectangular steel framing member. It measures 1⅜" x 2⅝" x .047 thick, made of low carbon, galvanized steel. The machine also forms this section from pre-enameled stock.

The work goes through on the K&R machine pictured above, from an Uncoiler through a Leveling Roll equipped with Pull-out Rolls to a Flying Cut-off and Punch. Cut lengths then pass into the Forming Machine.



Punching and shearing are both done at once — cutting and punching holes in the trailing end of one piece and the lead end of the next. Flat strip sheets on which this has been done are shown at left.

Machine consists of 11 forming stands on a 12-stand base — allowing for addition of another stand if needed later on.

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Cold Roll Forming Machines
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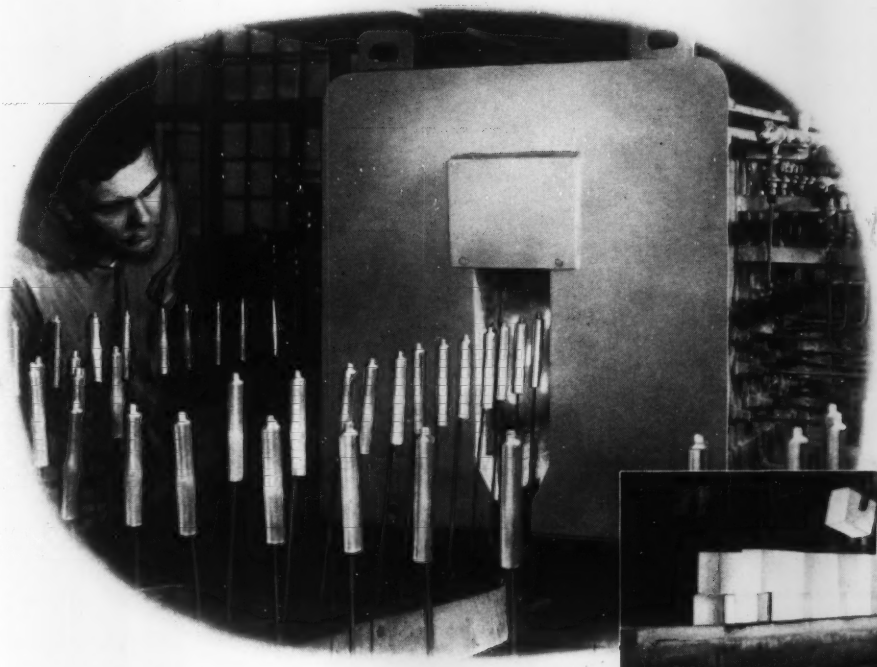
Annealing Featherweight Aluminum Tubes

or

HEATING HEAVY STEEL SECTIONS



Aluminum tubes work-harden after forming, must be annealed. Selas Gradiation anneals on the production line at A. H. Wirz, Inc. Helps cut tube manufacture from 2 days to 45 minutes.

Alloy steel die blocks, 8" to 24" thick, are heated to 1550°F for hardening in Selas custom-built furnace at Heppenstall Company. Completely automatic program-control heating reduces previous 20-30 hr. cycle to less than 4 hr. Sonic testing assures that fast heating is practical and safe.

. . . automatic *Selas Gradiation*® speeds production

● Selas Gradiation Heating treats both thin aluminum tubes and thick steel die blocks with the same efficiency. Annealing in one case, heating for hardening in the other, the workpieces respond to the preciseness, the uniformity, the controllability of Gradiation heating with a speed never before accomplished by conventional methods.

Widely separated operations, yet Selas in-line equipment keeps pace with modern production requirements. To meet the increasing demand of automation, Selas custom-builds specialized equipment designed to accommodate the individual workpiece. Send for informative articles describing in more detail the above applications and for information on Selas Gradiation fast heating. Address Dept. 27.

Selas engineers will be glad to discuss your heat-treating needs with you.

SELAS
CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION

THE Lifeline IS MOVING

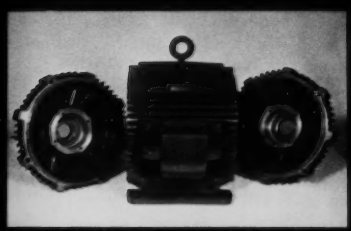
now, industry-proven motor design available in large sizes, giving more motor for modern production systems

Westinghouse anticipates modern motor requirements in the new line of large-size Life-Line® "A" Motors—with design and construction features for longer motor life, lower maintenance, and better system operation. You get more for your motor dollar. New models will be available in both drip-proof and totally-enclosed styles with frame sizes through 445.

POWER-UP for tomorrow's production needs with the new large-size Life-Line "A" a-c motors. For complete information . . . call your Westinghouse sales engineer or write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

YOU CAN BE SURE... IF IT'S Westinghouse

Tested and proven Bondite*, Bondar* and Mylar® insulating materials are used throughout the larger motors, guaranteeing the performance needed for heavy-duty service. ® Du Pont Trade-Mark

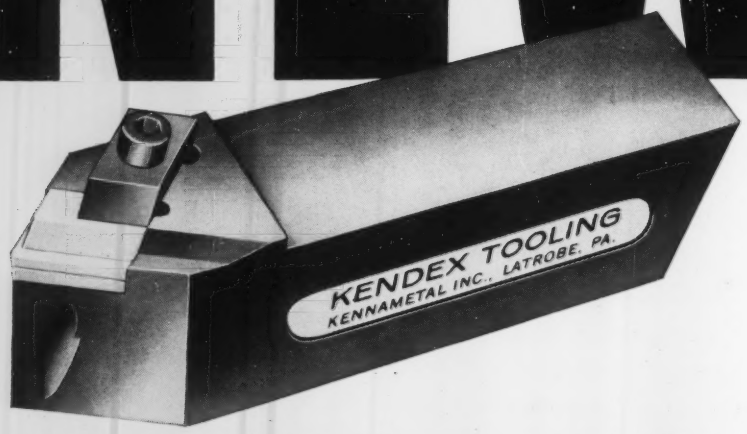


For outstanding motor protection a rugged new housing has been designed, featuring internal bracket ribbing for greater protection against physical abuse.

For flexible specification to match operating conditions, three types of bearings are offered: sealed-for-life, twin-shielded greasable and sealed sleeve.

*TRADE-MARK J-22040

NEW



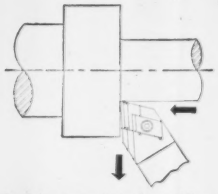
KENDEX PROFILING TOOL

The first "throw-away" insert profiling tool for both roughing and finishing cuts

Here is a new Kennametal Tool, designed specifically for today's contouring machines . . . a profiling tool that incorporates the time-saving, cost-reducing, production-boosting "throw-away" insert feature . . . the first profiling tool with an insert that won't shift . . . *the first profiling tool that can be used for roughing and intermediate cuts, as well as finishing.*

Holders suitable for practically all modern profiling machines are available in three types and 18 sizes. Simplified design provides a rigid assembly, including a hardened alloy-steel shank and clamp. The solid carbide chip breaker plate, indexable insert, and solid carbide insert seat are made of *different grades of Kennametal*—each selected for properties best suited to their particular function.

Inserts are of two general types, right-or left-hand, in four grades. These will handle practically any profiling job. Each insert provides two factory-ground, indexable cutting edges ready for instant use. Each provides a positive rake angle which reduces horsepower requirements and assures more accurate duplication of shapes due to lower tool pressures.



Rigid support and positive clamping holds the insert in position when direction of cutting forces changes as in plunge or "face-out" cuts.

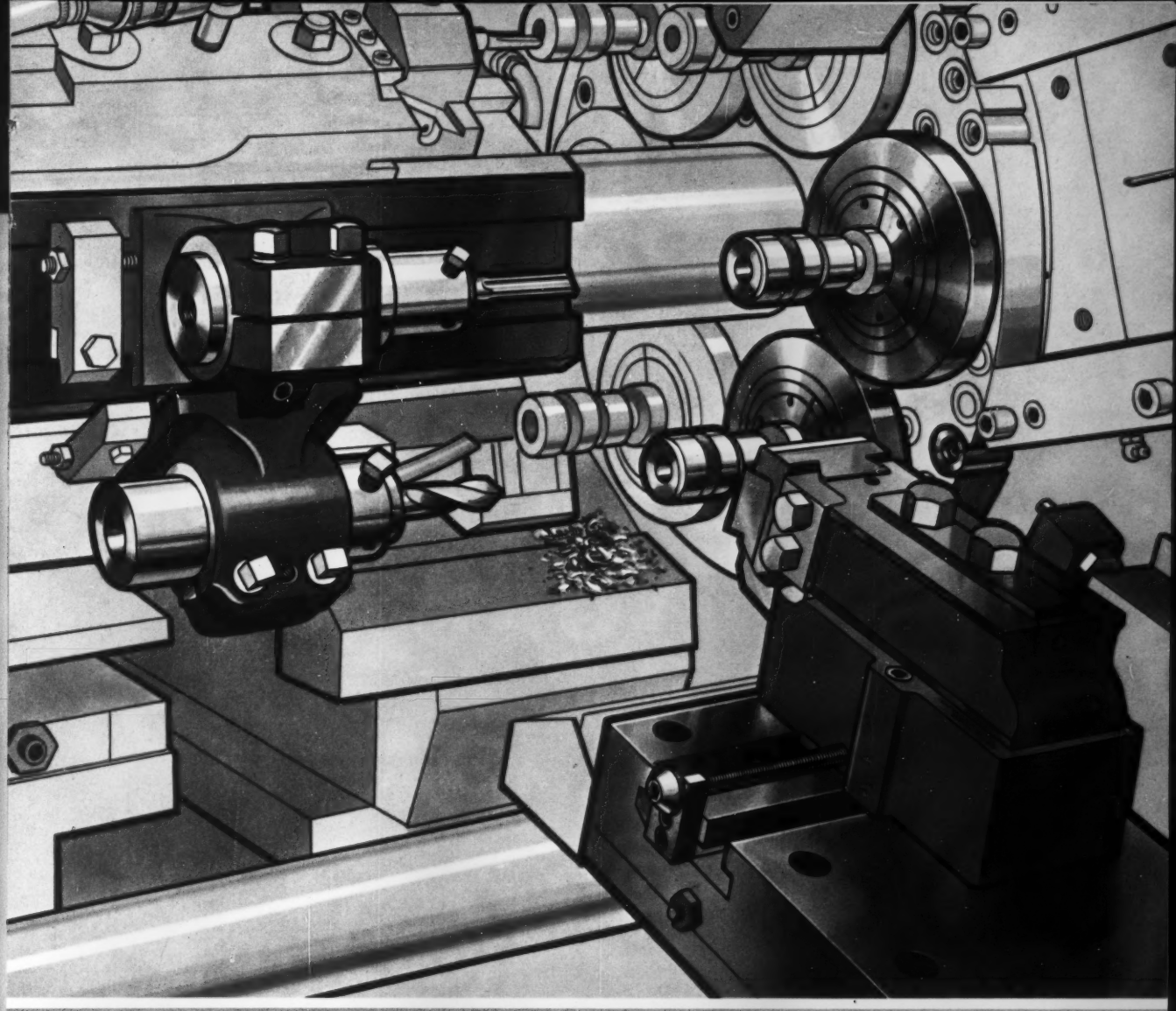
The chip breaker plates of solid Kennametal have exceptional strength and resistance to "pick-up" and so assure continuous chip flow. This clamped plate gives ideal chip control over a wide range of feeds and depths of cut, and eliminates expensive chip breaker grinding.

The insert seats, also made of solid Kennametal, have an offset to provide a hard back-up surface that will not "mush out" nor permit the insert to shift under heavy cuts. The seat provides positive insert seating and protects the holder.

For a full description of this important new production tool, write for just-off-the-press Booklet No. B-105. Address: KENNAMETAL INC., Latrobe, Pennsylvania.

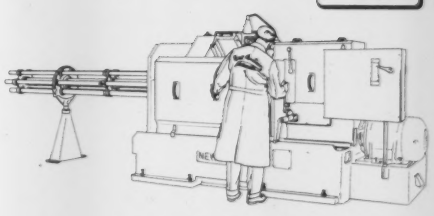
C-3050

INDUSTRY AND
KENNAMETAL
. . . Partners in Progress

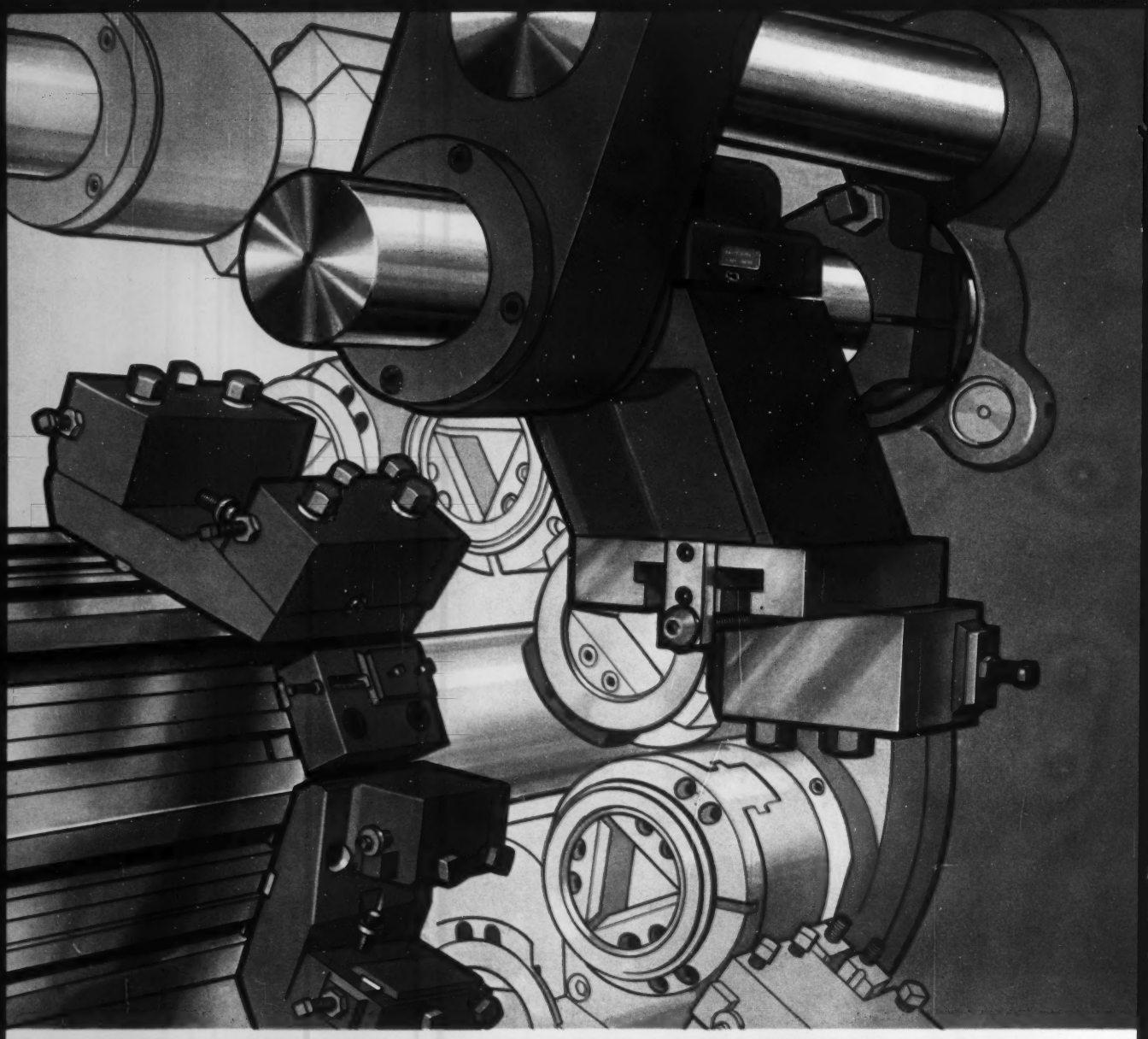


less wear means more profit

New Britain bar machines are "built to stay accurate." Hardened spindle nose cross slides, eccentric cross slide stop buttons and tool slides, plus carrier lifting during index, are only a few of many *exclusive* New Britain features for preserving long-run accuracy. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.



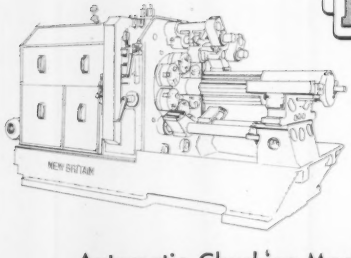
Automatic Bar Machine



when the job calls for a big, husky chucker

pick a New Britain

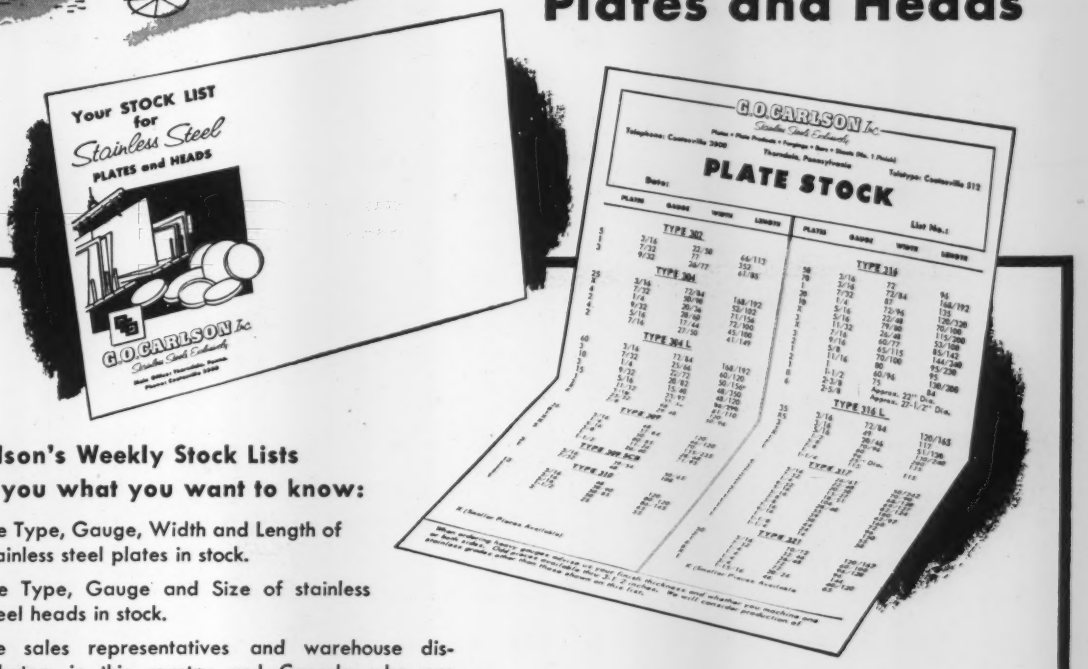
New Britains are massive, not only in over-all size and weight, but in every individual feature. Rugged forming arms and tool slides transmit smooth power to the cutting edge in every position. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.



Automatic Chucking Machine

Keep up to date...

on Stainless Steel Plates and Heads



Carlson's Weekly Stock Lists tell you what you want to know:

- the Type, Gauge, Width and Length of stainless steel plates in stock.
- the Type, Gauge and Size of stainless steel heads in stock.
- the sales representatives and warehouse distributors in this country and Canada who are ready to serve you.

YOU can save time by checking these weekly stock lists. Here is an up-to-the-minute report on our large, diversified stock of stainless steel plates and heads that have been produced especially for chemical industry applications.

Carlson plates in Types 304-L, 316-L and 317-L are more and more in demand. Substantial stocks of these extra-low-carbon grades, along with other chromium-nickel Types 302, 304, 309, 309-S, 310, 316, 317, 321, 347 and 348 are available. Chromium grades 405, 410, 430 and 502-½% Mo are always in stock. Two precipitation-hardening grades, Types 17-4 PH* and 17-7 PH*—new plate grades that combine ease of fabrication, hardenability, high strength and corrosion resistance—are now in production and limited stocks are carried. To complete the story, stainless steel heads in Types 304, 304-L, 316 and 316-L are also stocked and can be shipped in a few days.

Make Carlson your *one-stop* source for that complete bill of material—stainless steel plates, heads, rings, circles, flanges, forgings, bars and sheets (No. 1 Finish).

When you need stainless plate . . .

Carlson gives you what you want when you want it!

*Trade Mark of ARMCO STEEL CORPORATION

G.O.CARLSON Inc.

Stainless Steels Exclusively

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Write for your copies of Carlson's Weekly Stock Lists . . . use this convenient coupon.

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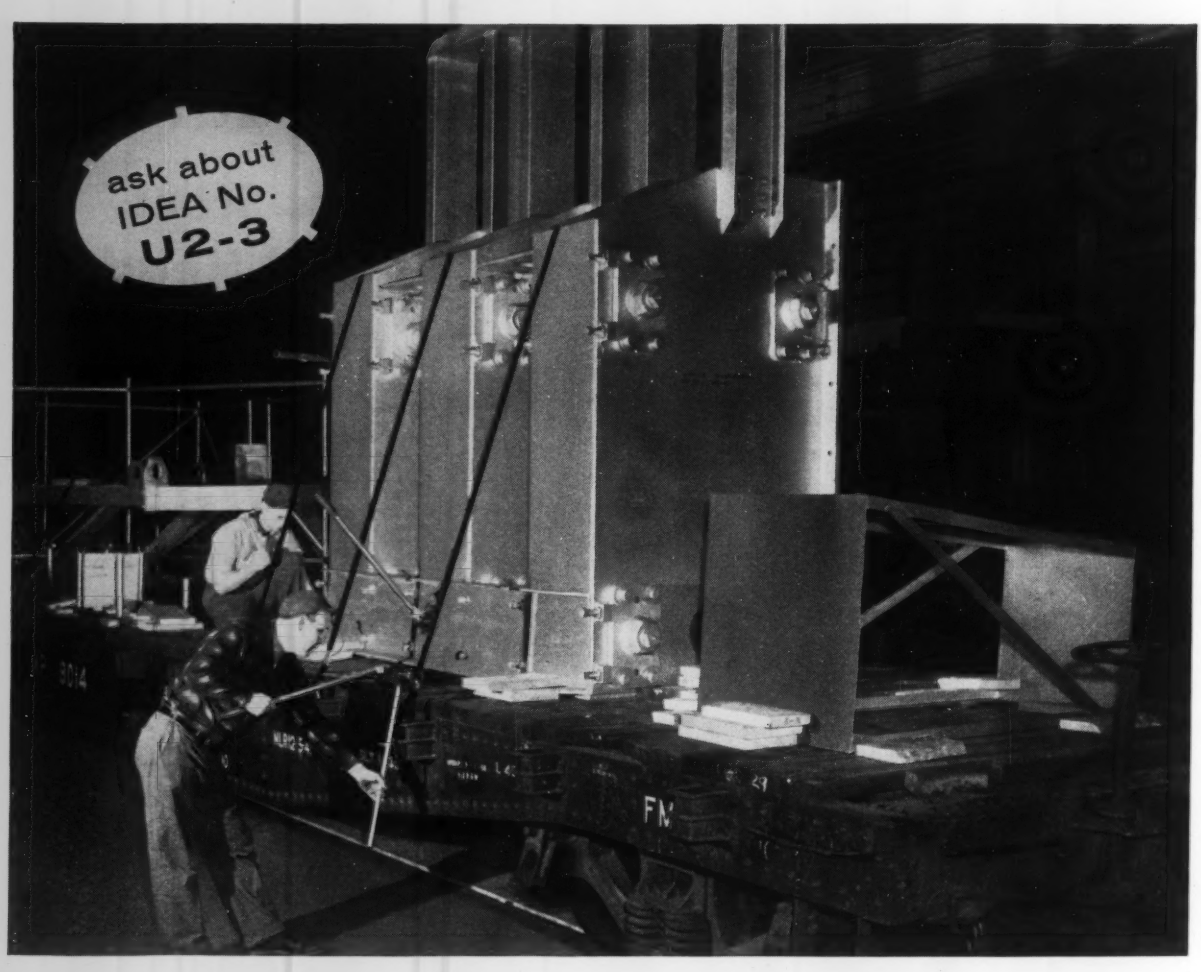


Consult your AIM*. . . Whiting Corporation does . . .

Acme Steel Strapping protects electric furnace shipment

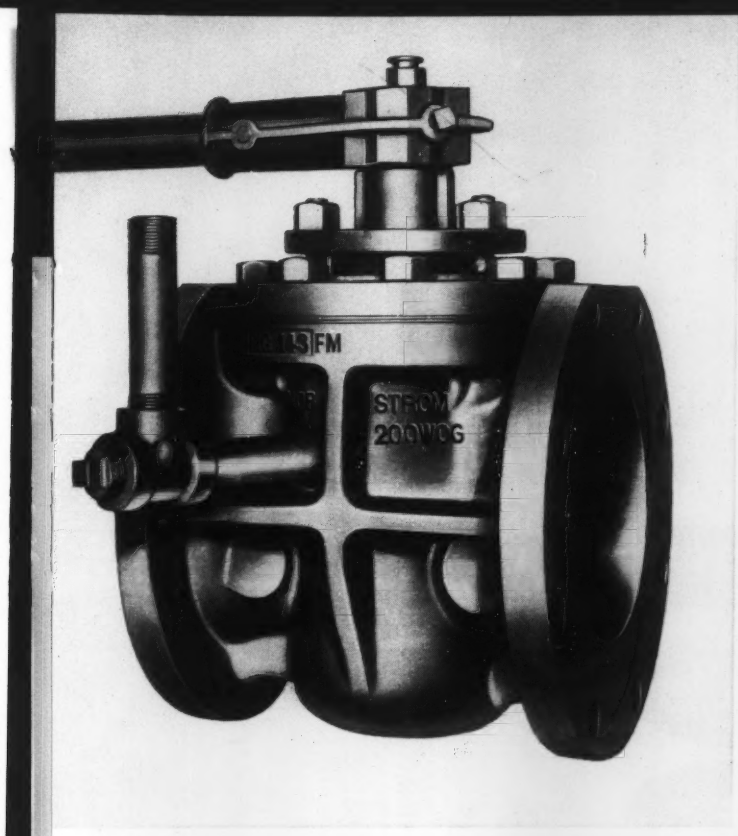
When the world's largest electric copper melting furnace left the shops of its manufacturer, Whiting Corporation, Harvey, Illinois, it was securely braced and protected for flatcar shipment with heavy-duty Acme Steel Strapping. It arrived without damage, shifting, or delays en route for securement adjusting. (Idea No. U2-3)

Acme Idea Man Andy Bassi helps Whiting Corporation solve its carloading problems.

Whiting Corporation relies on heavy-duty Acme Steel Strapping to tie-down and protect rail shipments of all heavy industrial machinery and equipment it manufactures. Shipments are loaded and secured with steel strapping in less than half the time required by the former method of using threaded steel rods that had to be shaped to fit the loads. And a crew of only two men, instead of three, can do the job, releasing a man for other plant duties.

***Consult your Acme Idea Man** for advice on ways to better protect your products for handling, shipping, storage. His Ideas-in-Action files contain scores of performance-proved Ideas that can be adapted to meet your needs. Write Dept. SDU-67, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

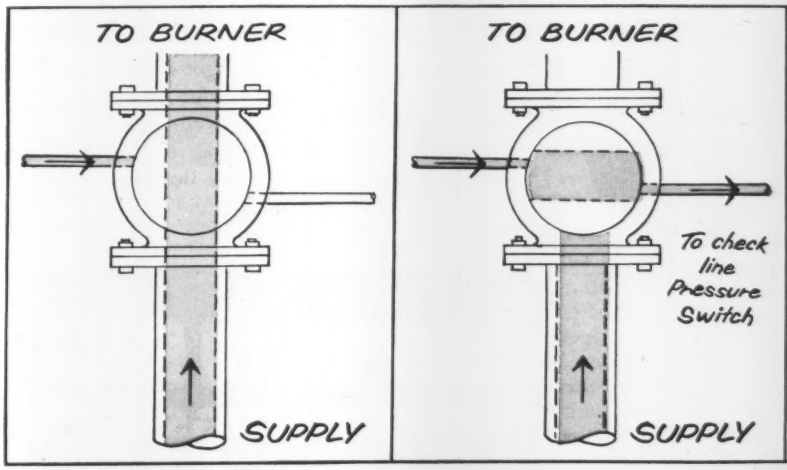


HOW TO SPECIFY SAFETY

In gas-fired industrial furnaces, ovens, dryers and boilers

By using Rockwell-Nordstrom valves specially adapted for a supervising cock and gas safety control system, you can assure a positive method of preventing "lighting-off" explosions in gas-fired equipment.

Fully approved and recommended by the Factory Mutual Fire Insurance Companies, this system insures closure of all individual burner cocks *before* the main burner gas safety shut-off valve can be opened. The key part of this system is the specially adapted Rockwell-Nordstrom valve incorporating two side outlets. These side outlets are connected in series with adjacent valves forming a new continuous passageway through all closed valves in the system. The FM (Factory Mutual) system prevents accumulated gas in either furnace or combustion air piping and eliminates crucial waiting for pressure build-up as in by-pass orifice control systems.



In lighting-off, operator first turns gas into small tubing connecting cock side-ports. If cocks are fully closed, gas flows through by way of side ports and operates checking pressure switch. This energizes electric safety shut-off valve on main gas line so operator can open it manually. If even one valve is slightly open, checking pressure switch can't operate and electric valve can't be opened.

The FM valves are only one of a wide selection of special feature valves in the Rockwell-Nordstrom *complete line* of lubricated plugs. For more information, write Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

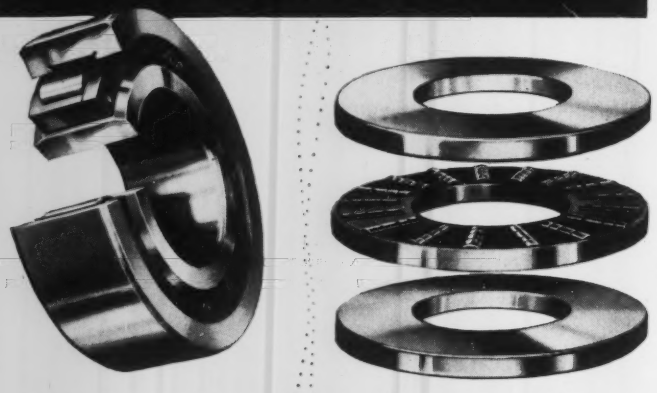
ROCKWELL-Nordstrom VALVES

Lubricant Sealed For Positive Shut-Off

solid cylindrical roller bearings

for every type of steel mill operation . . .

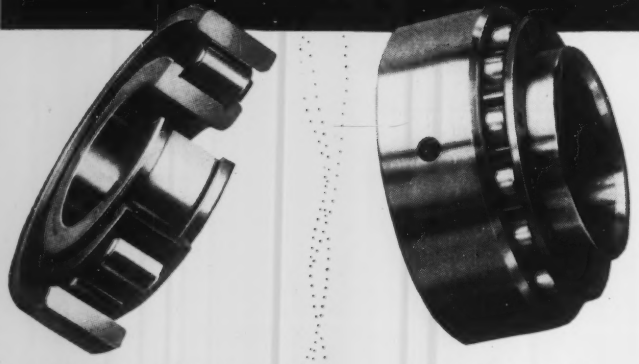
FOR HEAVY DUTY



Radial Type, Bronze Retainer

Thrust Type, Bronze Retainer

For Dependable Performance at Moderate Cost



TRU-ROL, Segmented steel retainer

Metric Series, steel cage—Trunnion-End Rollers

• Let Rollway help you select exactly the right bearing for your specific application. A wide choice of types and sizes is available: for roll necks, shears, lorry cars, screwdowns, skelp mills, runout tables, charging buggies and ladle cranes. Rollway bearings have been especially serviceable in bridge wheels, trolley wheels and ingot cars. Rollway's no-cost, no-obligation engineering service is available at all times through your nearest engineering office or authorized Rollway distributor. Rollway Bearing Co., Inc., Syracuse 4, N. Y.

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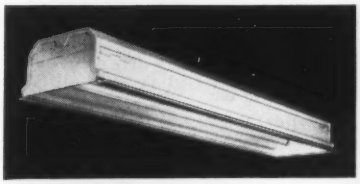
MANUFACTURER SHEDS NEW LIGHT ON WEIRZIN® RUST PREVENTION



In the market for a rust-resistant, eye-appealing and economically enduring zinc-coated steel? Then tune in on what the Edwin F. Guth Co., St. Louis, Mo., a leading manufacturer of lighting fixtures, has to say about Weirzin. For example:

RUST PREVENTION: "Weirzin electrolytic zinc-coated steel sheets *assure* our customers of a rustless product regardless of what section of the U.S.A. or hemisphere our Guth fixtures are sold. Whether it's damp, dry, moist or cold, Weirzin sheets once coated with paint really provide a finish that lasts."

PAINT SAVINGS: "There's a decided savings in the amount of paint we use; our finishes seem to grab hold of Weirzin sheets and stay there. Hence, with more positive paint adherence, we use considerably less paint. And, we find our present paint equipment can carry the load without the need for additional equipment."

Chemically treated Weirzin takes a beautiful paint, lacquer, enamel or lithographic ink finish. Holds it better than any other form of steel. Eliminates underfilm corrosion. Weirzin's electrolytic-process zinc coating has the ductility and toughness to withstand the severest fabrication operations. No flaking, peeling; no need for coating or re-coating after fabricating. For specific information on Weirzin in *your* applications, write Weirton Steel Company, Dept. B-15, Weirton, W. Va., for our free illustrated booklet—"Weirzin."

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

FOR MECHANICAL TUBING.

Because SHELBY SEAMLESS MECHANICAL TUBING comes to you with the hole and basic shape already made . . .

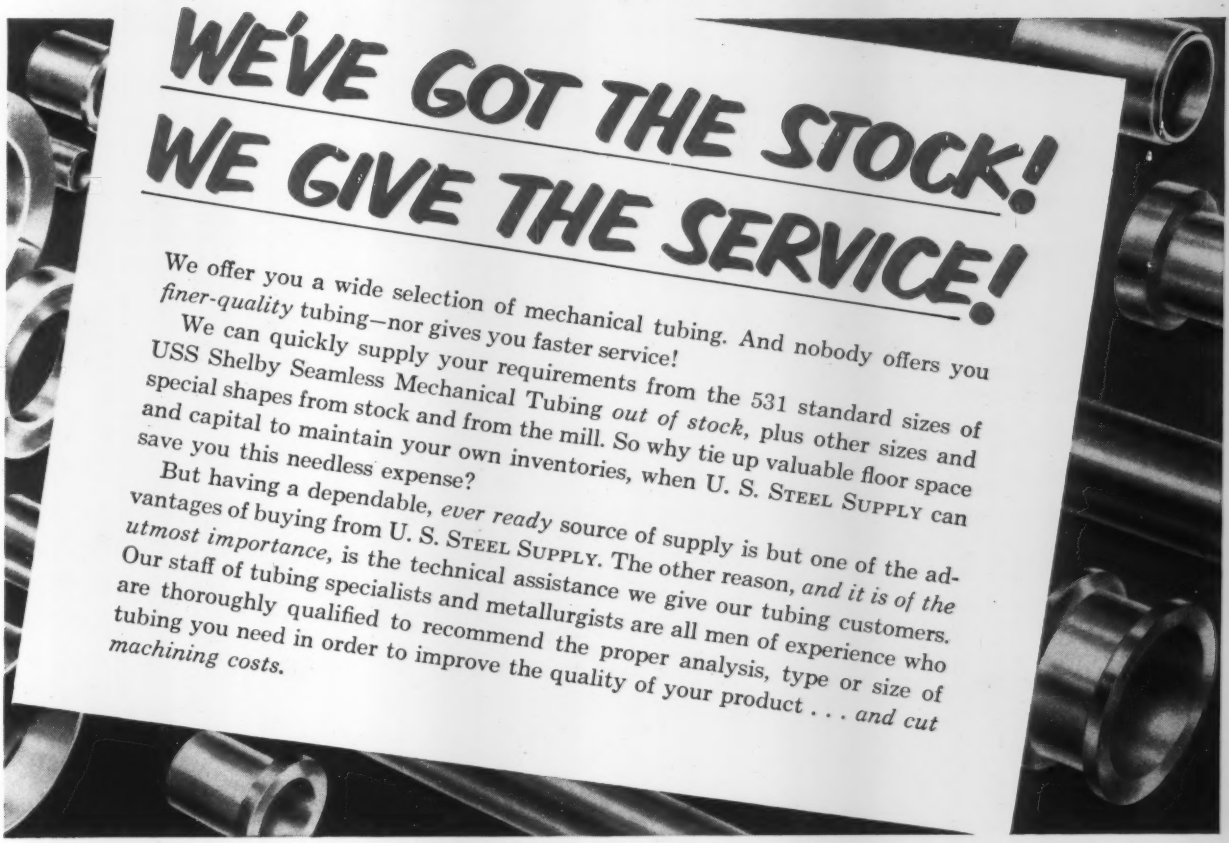
YOU CAN PRODUCE MACHINED PARTS LIKE THESE AT SAVINGS UP TO 50%

If you have been making parts like these from solid stock, you can make them better, faster and with less cost by switching to Shelby Seamless Mechanical Tubing. For with Shelby Mechanical Tubing, you eliminate or greatly reduce many time-and-labor-consuming operations connected with boring and machining.

Shelby Mechanical Tubing can also be effectively substituted for forgings, with equally attractive savings in time and labor, because the extremely close tolerances you get with tubing permit you to omit the double chucking required with forgings.

The excellent machining characteristics and uniformity of Shelby Seamless Mechanical Tubing enable you to *turn out parts by the millions, and the last part will be as metallurgically and dimensionally accurate as the first.* These advantages save wear on tools and needless waste of steel.

...CALL U.S. STEEL SUPPLY



WE'VE GOT THE STOCK! WE GIVE THE SERVICE!

We offer you a wide selection of mechanical tubing. And nobody offers you *finer-quality* tubing—nor gives you faster service!

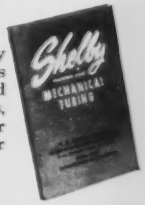
We can quickly supply your requirements from the 531 standard sizes of USS Shelby Seamless Mechanical Tubing *out of stock*, plus other sizes and special shapes from stock and from the mill. So why tie up valuable floor space and capital to maintain your own inventories, when U. S. STEEL SUPPLY can save you this needless expense?

But having a dependable, *ever ready* source of supply is but one of the advantages of buying from U. S. STEEL SUPPLY. The other reason, *and it is of the utmost importance*, is the technical assistance we give our tubing customers. Our staff of tubing specialists and metallurgists are all men of experience who are thoroughly qualified to recommend the proper analysis, type or size of tubing you need in order to improve the quality of your product . . . *and cut machining costs.*

. . . and, remember, only U. S. STEEL SUPPLY gives you the extra time-saving BONUS of "GRADE MARKED" Shelby Tubing!

When you buy from U. S. STEEL SUPPLY, you are assured of getting not only the finest mechanical tubing on the market, but you also get our exclusive "Grade Mark" Service—*the newest aid to better stock room control offered industry*—at no extra cost.

"Grade Mark" Service is our new and improved method of bundling and marking shipments of Mechanical Tubing, and is designed to simplify the identification of the tubing in your order and make it much easier for your receiving department to stock incoming shipments properly. Your order will be shipped out in neatly strapped bundles, and each bundle will carry a seal which clearly shows the grade of tubing in that particular bundle. Thus without altering your stocking procedure in any way, you save time and trouble in locating, identifying, and handling the needed grade. Your order will be shipped from the warehouse nearest the point of delivery.



SEND FOR THIS FREE BOOKLET—It's a handy pocket size reference book on Shelby Seamless Mechanical Tubing that you'll turn to again and again. Covers tolerances, machining allowances, physical properties and other important data. For your free copy of this 115-page book, contact our nearest office.

U. S. STEEL SUPPLY

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the general utility STAINLESS STEEL

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This straight chromium stainless grade possesses desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that are also of value in many civilian applications. More than 50% of all stainless applications could satisfactorily employ 430 stainless as an economical and practical material. Type 430 stainless costs 10¾ cents per pound less than the 18-8 grade. Some of our customers are already saving more than $215 per ton using our MicroRold 430 stainless sheet. Why not investigate the possibilities of this general utility 430 stainless.

Send today for your copy of our 24-page booklet, "MicroRold 430 Stainless Steel Handbook."

***MicroRold* 430 sheets** are available up to 48″ wide as thin as .010″, and up to 36″ wide as thin as .005″ in commercial finishes and tempers.

Washington Steel *Corporation*

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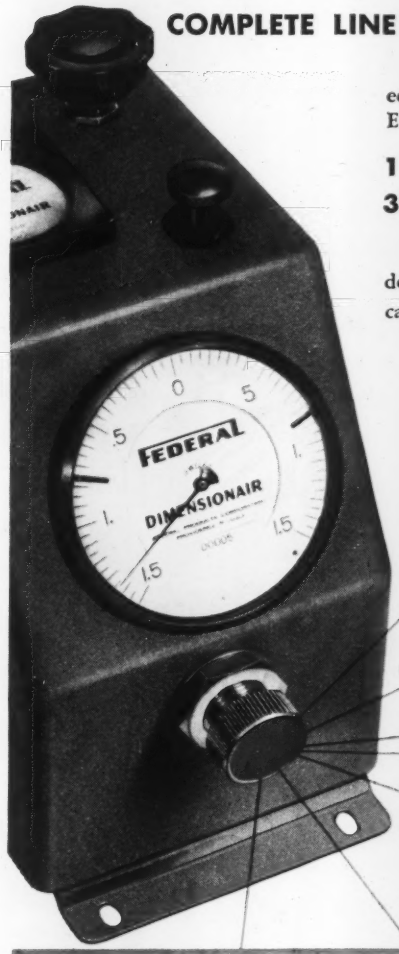
GET MORE OUT OF AIR GAGING WITH THE DIMENSIONAIR

COMPLETE LINE OF ATTACHMENTS FOR EVERY MEASURING NEED



It's so easy to greatly increase the scope of Dimensionair usefulness — and do it economically by using any of the "already designed and built" Attachments. Each of these Attachments answers three basic requirements.

1 Easily attached. **2** Wide range of adjustment.

3 Performance in keeping with quality of the Dimensionair

Let us show you how these Attachments will give you more for your air gaging dollar. Write for Catalog 56D or ask our nearest representative to discuss applications in terms of your own needs.

FEDERAL PRODUCTS CORPORATION
7216 Eddy Street • Providence 1, R. I.

AIRPROBE

Small and easily attached to many types of stock model gages. The ideal Attachment where mechanical contact is desired. Its long range per magnification and availability in .003, .006, .015, and .030 ranges adapt it for practically any type of air gaging, thereby bringing the benefits of air gaging to more unusual types of measurement.

Adjustable AIR SNAPS

Made in five sizes, 0" to 6", each having a wide range of adjustment. Anvils, precision lapped, remain flat and parallel throughout entire range of adjustment. Does not disturb the regular Dimensionair calibration: (.003" range at 2500:1 magnification.) Self-zeroing so that only a single master is required.

Adjustable AIR BORE GAGES

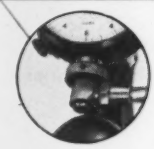
Only four gages cover all measurements from ½" to 8". Concentricity of centralizing contacts with the measuring contacts is so precise gage can be set with gage blocks or micrometer. Centralization remains accurate even though gage is cocked laterally, and is maintained throughout the capacity of the gage.

AIR RINGS

Regularly furnished with two or three jets. Can also be furnished with one, four, or six jets. Jets are larger and recessed farther below surface than in competitive makes. This helps eliminate clogging and reduces wear. Inside diameters from .250" up to and including 3.010". Smaller and larger sizes on application.

AIR PLUGS

Furnished in various types . . . Through Hole, Counterbore, and Blind . . . and having one, two, three, four, or six jets as required. Available from .125" diameter, up. Smaller sizes available. The jet faces are set lower in plug and provide greater protection against damage: air jets are larger and less easily clogged. Available from stock in many sizes.



ARNOLDAIR

Links the Federal Dimensionair to your Arnold Grinding Gage to provide closer operator control than is possible using a Dial Indicator alone. The Arnoldair response smooths out surface irregularities, allowing the operator to consistently grind pieces within .0001" of nominal. Easily attached to any Arnold Gage. Catalog 55A.

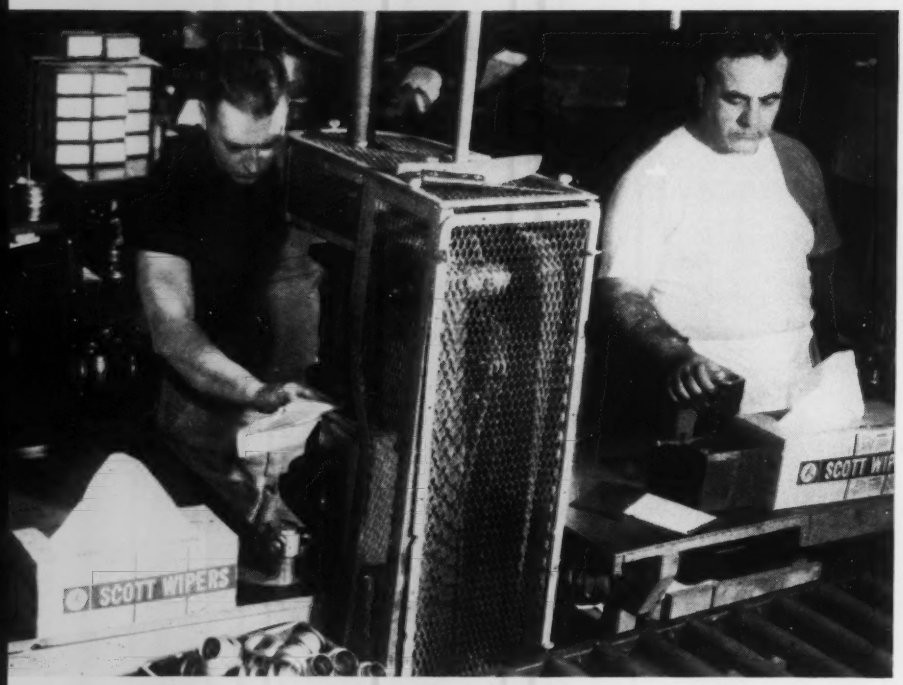
SPECIAL ATTACHMENTS AND FIXTURES

When the nature of the work or other conditions necessitate Special Attachments, Federal Engineers with their specialized gaging experience can provide the right design. Whether it's a specially designed Attachment or a modification of a regular design you can be sure it will be the best gaging Attachment for your work.

Ask **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging



At BCA, soft, absorbent, 2-ply Scott Wipers are used to wipe machines, tools, finished parts, hands, faces. They're lint-free, chemically treated for proper wet strength, and Perf-embossed® . . . a special process that gives thorough cleaning action, speedy absorption.

WIPER PROBLEM? Look what BCA did with Scott Wipers!

Precision ball bearings made by Bearings Company of America, Division of Federal-Mogul-Bower Bearings, Inc., are used world-wide in cars, trucks, tractors. They are produced on automatic screw machines. Scott Wipers were put on trial in BCA's plant, under these stipulations:

Scott Wipers were to be tried in place of cloths. The paper wipers would be adopted if acceptable to machine operators and inspectors . . . if they helped to solve the housecleaning problem . . . if they were found safer to use and if there was a cost saving realized.

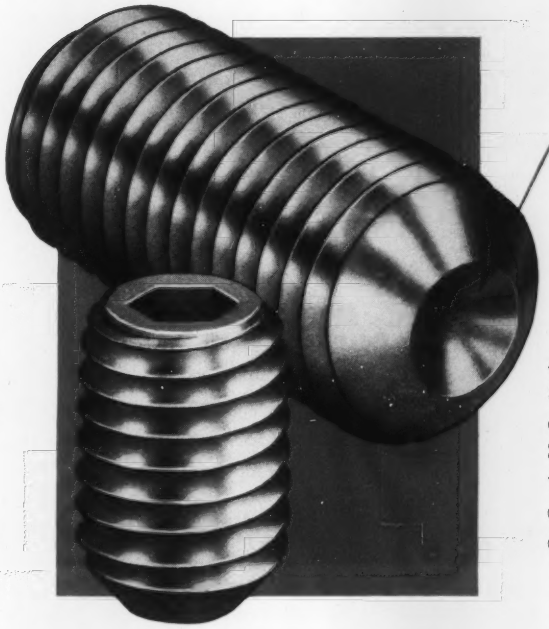
Results: employees preferred Scott Wipers,* the plants were kept cleaner . . . Scott Wipers fresh from a box were sanitary . . . carried no metallic particles to scratch or cut . . . and Scott Wipers saved BCA at least $71 a month—*not* including savings resulting from eliminating hidden costs of handling, weighing, storing and dispensing cloth wipers!

Want to see improvements like this in your plant? Call your Scott man today or write Scott Paper Company, Department S-76, Chester, Pa.

SCOTT PAPER COMPANY

Makers of the famous Scott paper products you use in your home.
Consult your local TV schedules for Scott's program, "Father Knows Best."

*Patent Pending



ALLENPOINT will give you a bulldog grip at no premium in price!

Allen's scientific redesign of the cup diameter on set screws gives greatly increased resistance to *withdrawal* torque. You can count on Allenpoint Set Screws to stay tighter longer, under heavy strain and vibrations. This dependable premium performance of Allenpoints is yours to use without increasing the cost of manufacturing your products.

Uniform Class 3A Threads

Allenpoints' smooth, uniform threads prevent off-lead conditions like Fig. 1. With Allenpoints, you have full, even contact between the engaging flanks of the threaded members (Fig. 2) —and a tight friction lock over the entire length of the Allenpoint Set Screw.

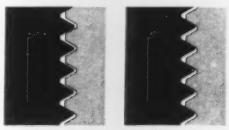


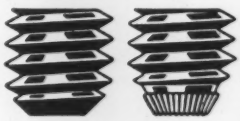
Fig. 1 Fig. 2

Strong, clean, deep sockets allow full wrenching leverage

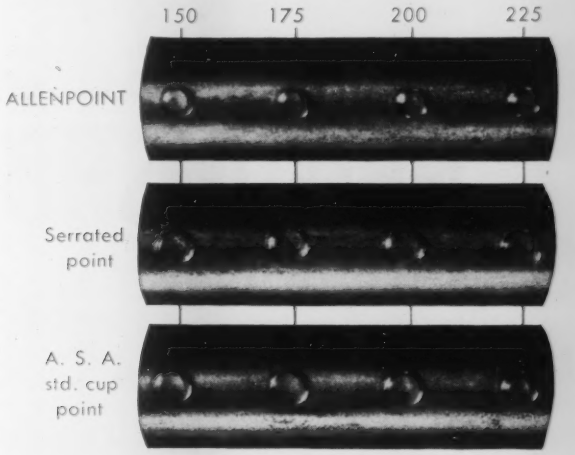
Sockets of Allenpoint Set Screws are cold forged to produce a deeper, smoother socket. No broach chips to interfere with proper seating of the key. This "pressur-forming" preserves the long steel fibers throughout the length of the screw—stronger walls allow maximum tightening torque.

One more full thread on ALLENPOINTS!

Allenpoint Set Screws have one more full thread than serrated point set screws. That means more holding power—especially important when you're using short lengths.



ALLENPOINT's performance compared for you



These actual-size, unretouched photographs show the cup pattern made by Allenpoints, serrated points, and A.S.A. standard cup point set screws in a 3/4" steel shaft. At each degree of tightening force, Allenpoints make a full circle pattern, penetrating deeper for greater holding power.

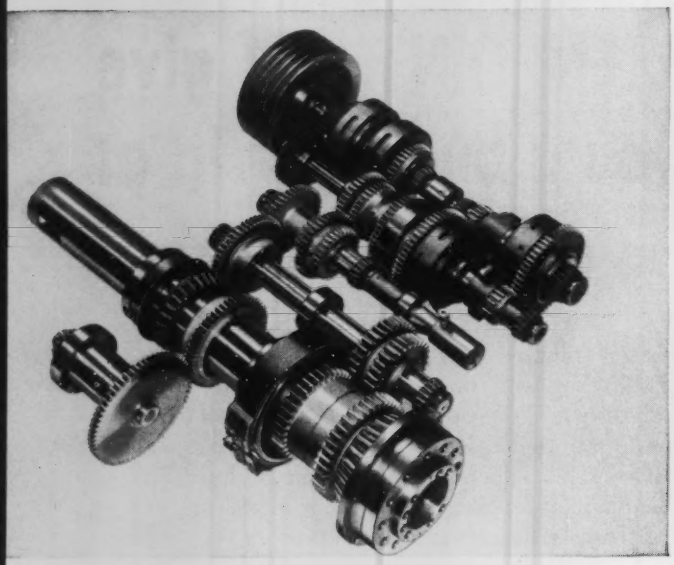
We'll be glad to send you more information and samples of Allenpoint Set Screws and other Allen Socket Screw products.

Stocked and sold by leading industrial distributors everywhere

ALLEN MANUFACTURING COMPANY
Hartford 2, Connecticut, U.S.A.

ALLEN HEX-SOCKET SCREWS HEAD

WANT MORE POWER, MORE SPEEDS?



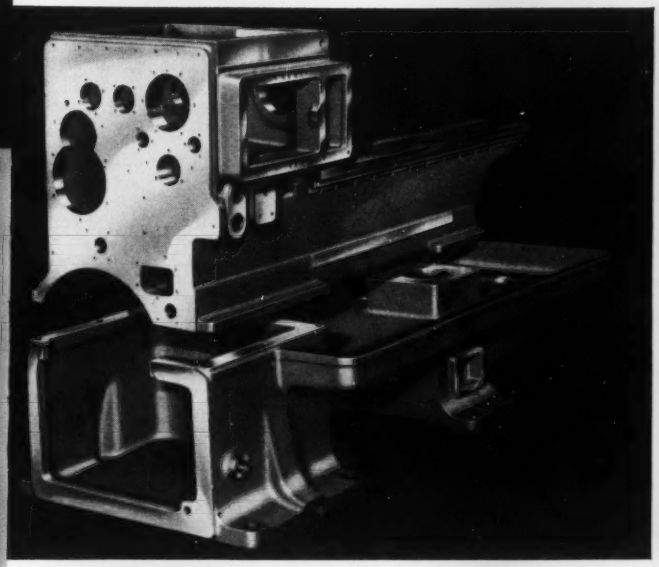
NEW HEADSTOCK GEAR TRAIN—sixteen different spindle speeds available, powered by up to 30 h.p. single-speed driving motor delivering full power at all speeds. Spindle is mounted on selected pre-loaded, precision-tapered roller bearings. Heavier, more rugged design provides smoother, quieter power.

HYDRAULIC SPEED SELECTOR—smooth, effortless speed changes. No waiting, no computing, no stopping of spindle, no releasing of main drive clutch. Operates direct or pre-set. Hi-Lo Lever permits instantaneous speed changes in 8:1 ratio without moving Speed Selector handwheel. Multiple Disc Clutches have automatic take-up for wear.

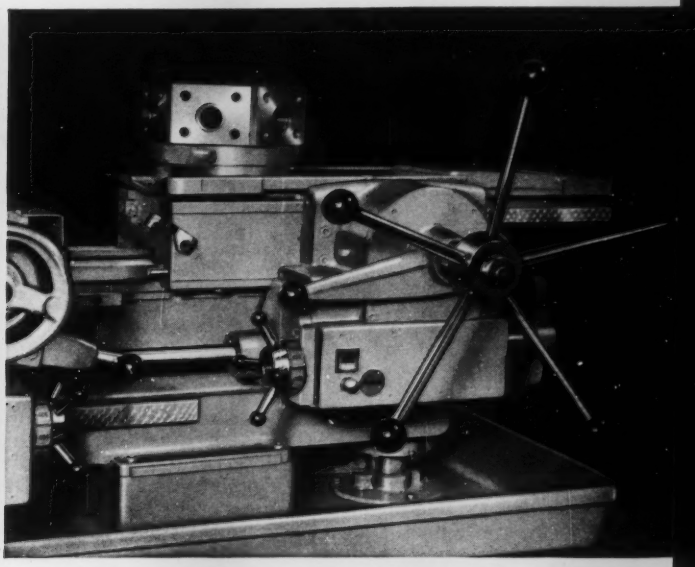
YOU GET THEM ALL...PLUS

NEW GISHOLT MASTERLINE

WANT HEAVY CUTS WITHOUT VIBRATION?



NEW HEADSTOCK AND BED CASTING—scientific design dampens out vibrations, assures smooth operation and simplifies holding closer tolerances. Made from semi-steel, poured in Gisholt's own foundry. Greater swing over ways permits bigger chucks and broader range of workpiece sizes. Provides a solid foundation for all types of work.



NEW TURRET RAM AND SADDLE—designed wider, heavier, more rigid to handle increased capacity and higher speeds. Dial-type feed selector makes feed changes faster, easier. Turret ram rigidly supported on 64-66 Rockwell C alloy steel way strips. Power transmitted through serrated tooth clutches, with shear pin protection against overloading.

GREATER VERSATILITY...WITH THE

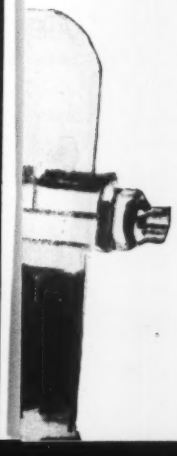
RAM TYPE TURRET LATHE

YOU'LL SPEED UP your production jobs—both large and small—with this more powerful, more versatile Gisholt MASTERLINE Ram Type Turret Lathe.

Here is a machine designed from end-to-end for easier setups, faster change-over and higher productive output than ever before. Check the advanced features illustrated above. Note the reserve power to handle your heaviest cuts—and to meet your tooling requirements of tomorrow. Note the extra spindle speeds—all at your operator's finger tips, without computing—for faster, better turning of any type material. And look over the new massive design, the over-all ruggedness that permits greater accuracy, closer tolerances, deeper cuts at punishing feeds without vibration.

Find out now how this powerful, flexible Gisholt MASTERLINE Ram Type Turret Lathe can reduce floor-to-floor time on your specific jobs. Call your Gisholt Representative today—let him show you how this advanced machine can fit most profitably into your production picture. Or write direct to Gisholt for the new literature described below.

READY NOW—all-new, 18-page illustrated Bulletin No. 1174-B, covering features, accessories, tools and floor plans on new Gisholt MASTERLINE Ram Type Turret Lathes. Ask for it!



GISHOLT

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

3 SIMONDS Production Saws that say "SOCKO" to High Cost Cutting

INSERTED TOOTH SAW — A real champion for production cutting of steel, brass, copper, aluminum. Alternately beveled and square High Speed Steel Teeth "tri-vide" chips for easy cutting and clearance in large cross-section and high speed sawing operations. The alloy steel plate is tough and shock-resistant. Easy, "do it yourself" replacement of the High Speed Steel Teeth simplifies maintenance.

SEGMENTAL SAW — For smoother finish production cutting or where finer teeth are required for thinner cross-sections. Longer service High Speed Steel segments (tongued or slotted type) in a tough alloy steel plate cut true, fast and free. Teeth are alternately square and beveled for easy clearance of "tri-vided" chips. Sharpen on any automatic grinder.

SOLID TOOTH SAW — For cutting small bars, extrusions, pipes and where narrow kerf is desired. Preferred for occasional cutting because of lower saw cost. Alternately beveled and square teeth for most jobs. Clearance ground and heat-treated to combine longest wear life with maximum toughness. Supplied in Simonds own steel—High Speed, Si-Maloy (Pat.), or Semi-High Speed.

Other High Quality SIMONDS Metalworking Products

HAND HACK SAW BLADES | POWER HACK SAW BLADES | FILES | BAND SAWS | ROTARY SHEAR KNIVES & SQUARING SHEARS | FLAT GROUND DIE STEEL

125 YEARS OF GROWTH • 1832-1957

SIMONDS SAW AND STEEL CO.

FITCHBURG, MASS.

For Fast Service from Complete Stocks Call your SIMONDS Industrial Supply DISTRIBUTOR

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
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ANOTHER OF THE GARLOCK 2,000

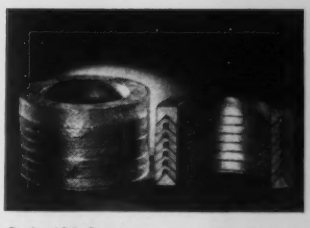
1000-Ton 4 column Farquhar Press forming heavy steel plate. Main rams and pull back rams are equipped with CHEVRON Style 431.

1000-TON PRESS
attests "stamina" of Garlock CHEVRON* packing

The shock absorbed during operation by this Farquhar 1000-Ton, 4 column press makes necessary the use of a packing that will automatically compensate for sudden changes in pressure. In addition, the packing must be extremely durable to minimize downtime.

That's why engineers at A. B. Farquhar Division of The Oliver Corporation, York, Pa., specify Garlock CHEVRON exclusively for the main rams and pull back rams of this press. CHEVRON's unique construction permits free operation of rams at all pressures. It automatically tightens or eases-off as pressures increase or decrease . . . prevents leakage without hampering operation.

CHEVRON is another vital part of "the Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals for every conceivable need—the only complete line. That's why you get unbiased recommendations from your Garlock representative. Call him today or write for CHEVRON Folder AD-115.



Style 431 CHEVRON assures low friction, positive seal, lasts longer than ordinary V-type packing, and works efficiently in shallow stuffing boxes.

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.

*Registered Trademark

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints, Fluorocarbon Products

Inland Ledloy*...the original leaded steels

Twenty years ago they said it couldn't be done. But Inland tackled the problem—discovered how to add lead to steel and produced the world's first commercial leaded steel in Inland furnaces. Since then, further research and refinement has been unceasing—each new Inland technical development providing still greater production possibilities for the metalworking industry. Due to constantly improving product quality, Ledloy steels today set the standards by which all other free machining steels are compared.

Anti-aircraft guns roared through the night during the Battle of Britain, consumed mountains of shells. Without shells the guns were useless, and production was strained to feed them. A British steelman, licensed by Inland to produce Ledloy, suggested its use as a means of breaking the production bottleneck. Inland and its British licensees got to work on the production of Ledloy for this job. Where Ledloy was used on existing facilities, shell production nearly doubled, the threat of an ammunition shortage relieved.

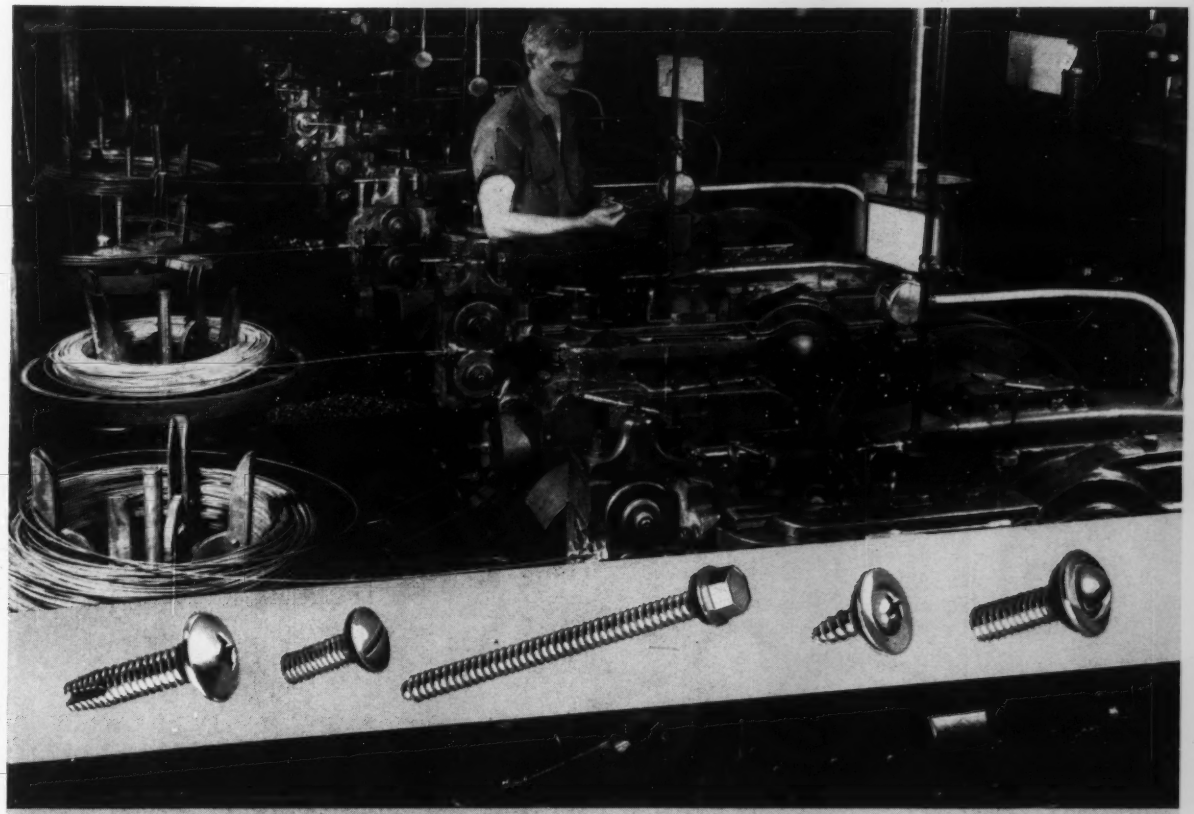
From then on, Ledloy steels increased their usefulness in the war effort. After shells were no longer needed, peacetime uses for Ledloy were discovered and grew rapidly.

Through these years, Inland has continued to refine and improve the unique machining characteristics of Ledloy. This unequalled experience makes Ledloy steels the world's most machinable.

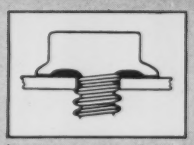
Experience makes Inland Ledloy better

INLAND LEDLOY is sold in cold drawn form, under various trade names, by leading cold drawers and steel warehouses from coast to coast.

***INLAND STEEL COMPANY** 38 South Dearborn Street • Chicago, Illinois Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York • *registered trade name of Inland Steel Company, pioneer in the development of leaded steels.*



Townsend Cold-Forges New *Tuff-Tite** Line On National Headers



* Neoprene washer trapped under head of TUFF-TITE fastener seals hole—acts as cushion.

Townsend Company, New Brighton, Pennsylvania, 141-year-old manufacturer of rivets and fasteners, has been relying upon National Headers to cold-forge most of its output for the past 26 years.

Townsend continually applies its vast experience to the up-to-the-minute fastener requirements of its customers. The company's operating people find the rigidity, ruggedness and overall ability of National Headers particularly valuable in cold-forging *by the millions* Townsend's new line of TUFF-TITE leakproof fasteners.

If *you* need to make metal parts faster, stronger and at lower cost, may we work with you? Send us your prints and samples, or better yet, accept our invitation to come to our plant. *Here we can approach tomorrow's new and better ways of forging metal parts in the light of methods and ideas which our people are already developing and testing today!*

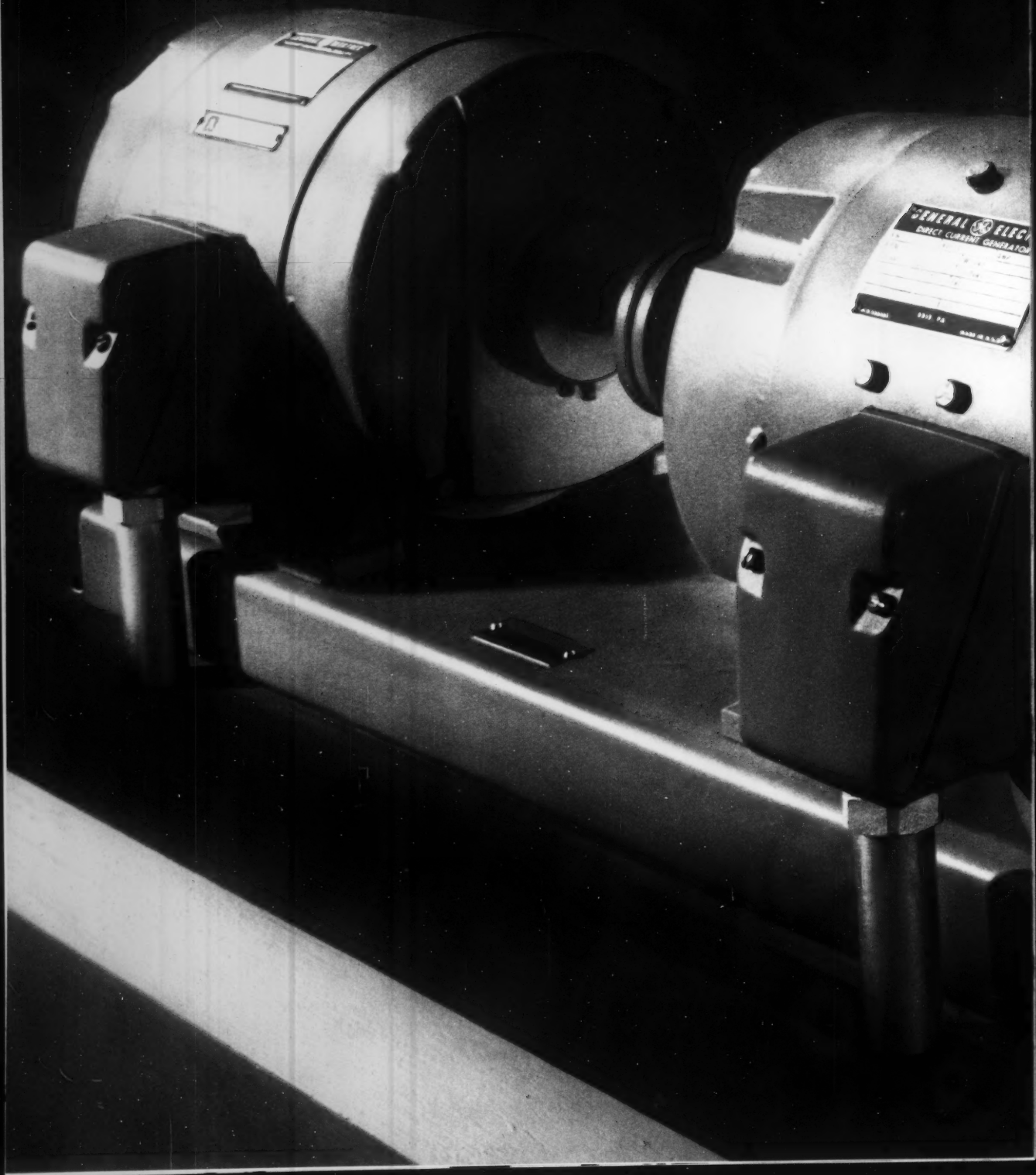
NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

To help you cut production costs . . .

NEW General Electric



D-c Power Source

KINAMATIC* — — — a new standard in direct-current generators and motor-generator sets—designed to give you higher output at less cost.

As a progressive manufacturer, you are faced with the problem of boosting factory output and beating rising production costs. Where your production process involves adjustable speed, tough duty cycles, frequent reversals or speed matching, you may have already applied the performance advantages of d-c drives. To help you further boost production and reduce your automation costs, completely new sources of constant and adjustable-voltage d-c power are now available—General Electric d-c Kinamatic generators and m-g sets, ¾–100 KW.

More Power Per Dollar—D-c Kinamatic generators pack more power per frame size than any previously designed G-E generator. Nine new kilowatt ratings more closely match both the power requirements of your standard d-c drive motors and the power output of standard prime-moving a-c motors. This new matching gives you a more efficient, more compact adjustable-voltage drive at lower cost.

And a Lot More—A d-c Kinamatic generator or motor-generator set can give you much more than savings on initial automation costs. If you would like to know more about the construction details, advanced performance characteristics and money-saving maintenance features of d-c Kinamatic generators and m-g sets, we would like to have a G-E Apparatus Sales Representative call on you. Or, if you prefer, we will send you copies of GEA-6461 and GEA-6355. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.* 813-2

* Trade mark of General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC

In 10 short years the Chambersburg CECO-DROP has become the standard gravity drop hammer of the forging industry. Some of the reasons for this astonishing success are these:

1 The Ceco-Drop is a proven tool, the original "Boardless Board Drop Hammer," with world wide acceptance.

2 More than 400 Ceco-Drops are in service in 119 forge shops all over the world. Many companies have initiated programs looking toward complete conversion to Ceco-Drops.

3 The Ceco-Drop has created new standards of performance, and established new standards of tolerance in drop forgings.

4 The Ceco-Drop minimizes leg fatigue in drop hammer operation. Hammermen prefer the Ceco-Drop.

5 The Ceco-Drop costs less to maintain, has fewer, more durable parts. Automatic lubrication prolongs parts life.

6 The Ceco-Drop is economical to operate. Air or steam is used only when the hammer is running.

7 The Ceco-Drop forges more minutes per hour. (Once it is set-up, just turn on the air or steam and forge.) It does more forging per blow, requires no board changes, no friction adjustment.

8 The Ceco-Drop is safer . . .The operator's station is clear. There are no overhead hazards. It has fewer, lighter mechanisms. It has a safety dog and safety cylinder cover. Power failure stops the hammer and clamps the ram.

9 The Ceco-Drop requires less die set-up time. Die changes are quicker, easier. It takes but a minute to adjust the stroke.

10 The Ceco-Drop has a wide range of operation due to the unique short stroke adjustment and control.

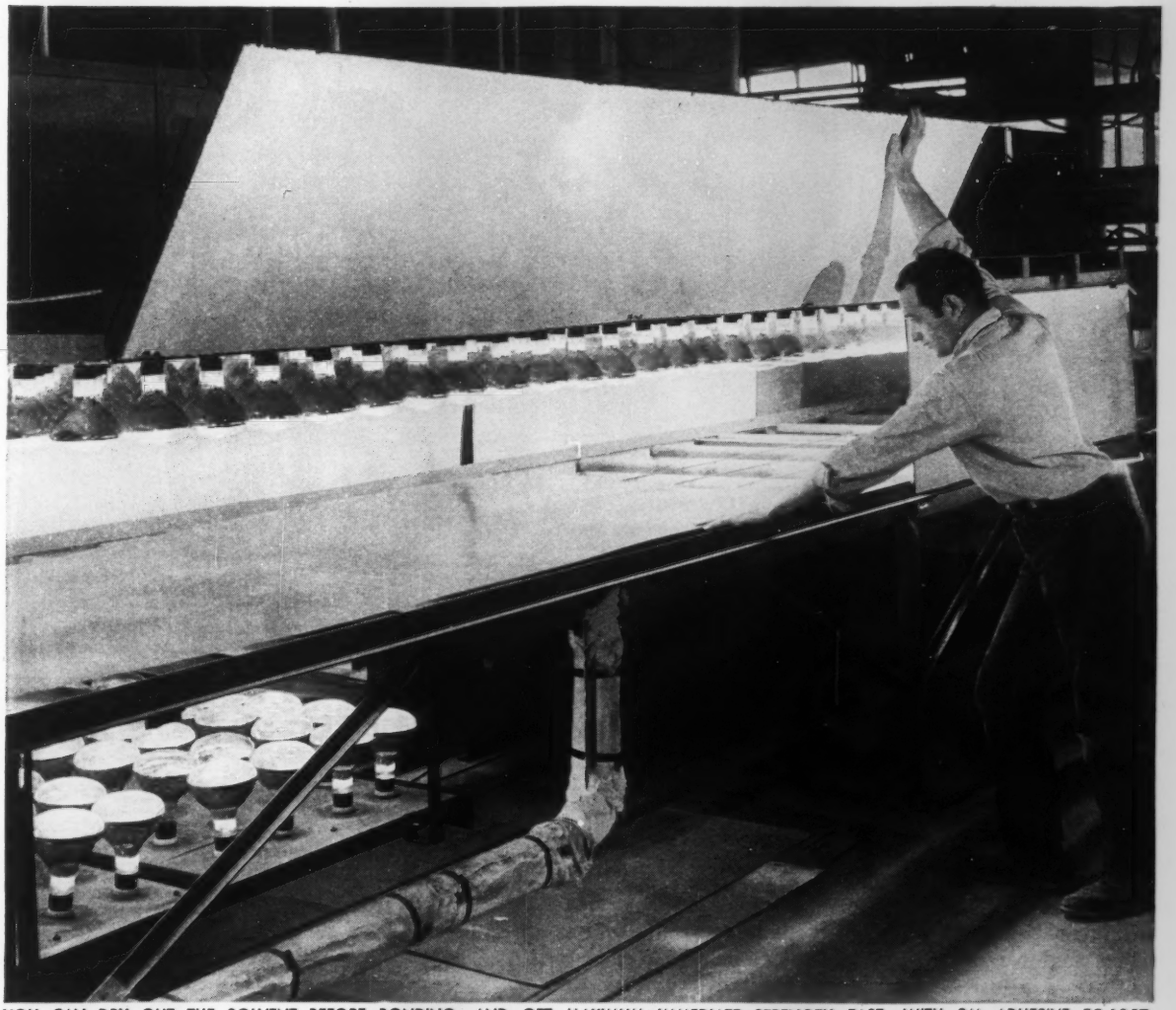
CECO-DROP

U. S. PATENT NO. 2,604,071, JULY, 1952 . . . OTHERS PENDING
CECO-DROPS HAVE BEEN BUILT IN SIZES FROM 500 LBS. TO 8000 LBS.

Builders of THE IMPACTER
"FORGING IN MID-AIR"

CHAMBERSBURG ENGINEERING CO. • CHAMBERSBURG, PENNA.

Speed high-strength sandwich bonding by predrying 3M adhesive EC-1357



YOU CAN DRY OUT THE SOLVENT BEFORE BONDING—AND GET MAXIMUM IMMEDIATE STRENGTH FAST—WITH 3M ADHESIVE EC-1357.

Here's new speed in making light, rugged sandwich panels for non-load-bearing uses!

It's EC-1357. This specially formulated, fast adhesive from the laboratories of 3M gives you high bond strength *immediately!* With infrared ovens, you can dry the solvent out of EC-1357 before bonding. Heat absorption is fast, due to EC-1357's dark color. You eliminate unnecessary drying and storage time. You need no clamps or heated presses, just cold press or nip roller. What's more, this cold bond continues to cure at room temperatures—gains added strength with age.

On metal or paper honeycomb cores, EC-1357 builds up a fillet for bigger bonding area and strength. Use EC-1357 with glass foam cores, too.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU! Consult 3M Research, contact your 3M Field Engineer or write on your company letterhead for information and free literature to: 3M, Dept. 66, 417 Piquette Ave., Detroit 2, Mich.

PRODUCT OF 3M COMPANY RESEARCH

MINNESOTA MINING AND MANUFACTURING COMPANY • ADHESIVES AND COATINGS DIVISION

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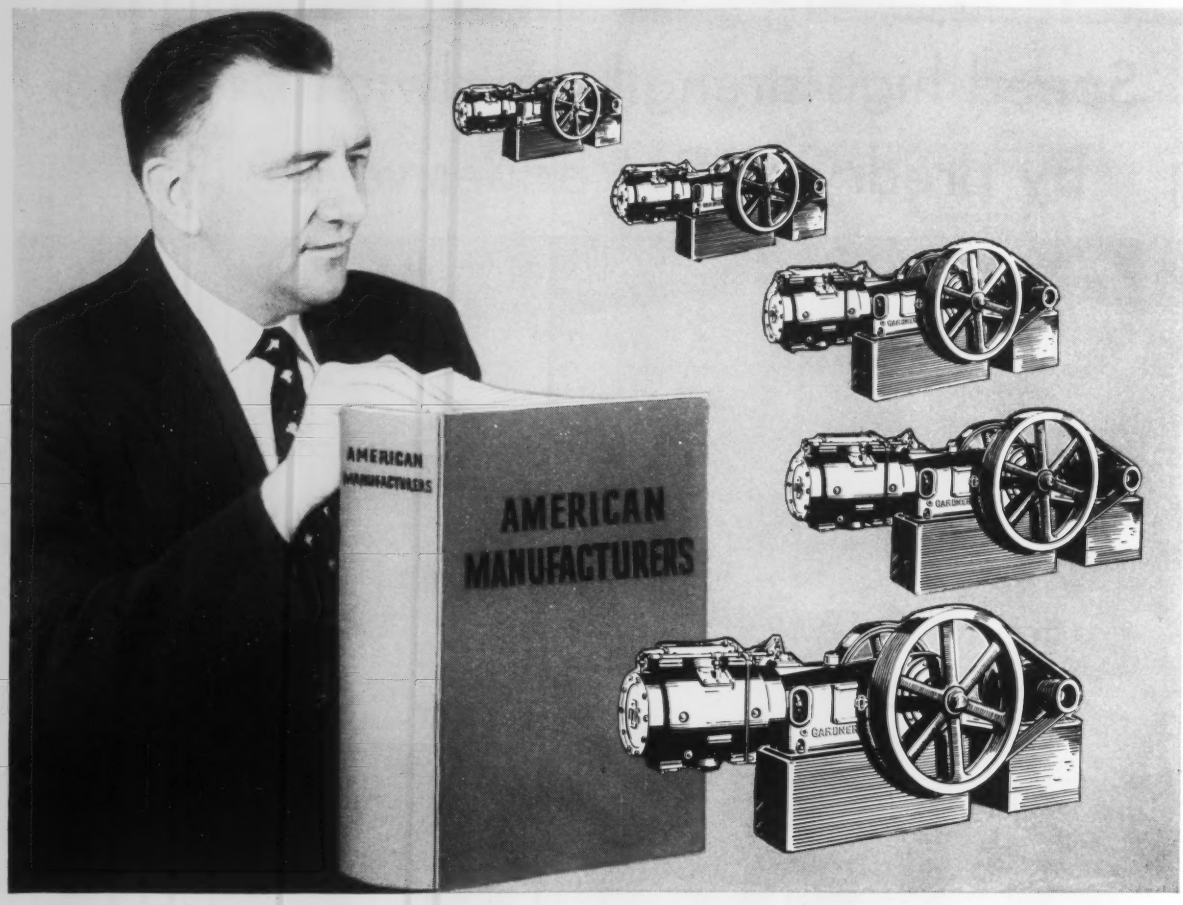
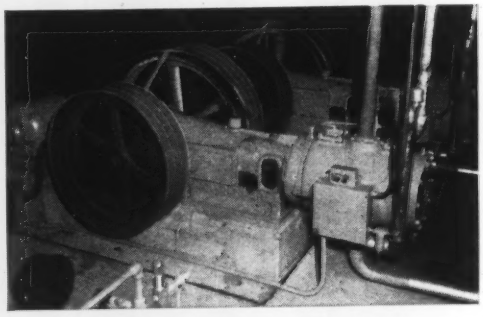


Known by the companies that keep it the Gardner-Denver RX compressor

Manufacturers that depend on the RX know it delivers more than air. It delivers years of trouble-free service and economy. Underneath its sturdy main frame are compressor parts engineered to run round-the-clock. Parts easy to inspect and adjust. Designed for smoother operation, better balance and lowest power consumption.

Full details of RX models from 100 to 1410 cfm piston displacement, for pressures from 15 to 150 psi, are described in Gardner-Denver Bulletin HAC-40. Write today.



RX installation being used for instrument air in power and light company.

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND M'N'NG

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curi.y Avenue, Toronto 16, Ontario

Something new... made better by aluminum

These 120-foot high-tension towers carry power across the 50 miles between Aluminium Limited's Kemano generating station and Kitimat smelter.

12-story aluminum towers carry world's largest high-tension cables

Across Canada's weather-wild Kildala Pass, aluminum is meeting a new challenge in structural design. These giant towers withstand tons of snow and wind pressure . . . support half-mile spans of ice-laden cable. Yet they were delivered by helicopter in prefabricated sections for quick assembly on the spot.

Aluminum a Natural

Aluminum was a natural for this job, since its properties match the specifications for strength, weatherproofness, light weight and easy assembly. Comparable steel towers would be 65% heavier and require 2⅓ times the man-hours to assemble.

Easily Fabricated

Created and engineered by Aluminium Limited, these towers also show how easily aluminum is fabricated. The tubular leg sections are formed in diameters to 38" by welding semicircular halves of rolled sheet. Crossarms are box girders up to 76 feet long, assembled with aluminum rivets.

New Fabricator Markets

With this knowledge and experience, independent U. S. fabricators can look for more business in heavy structural applications. To assure a dependable supply of primary metal for these future needs, Aluminium Limited is investing $3,000,000 a week in production facilities. Research, development and technical assistance programs are also expanding to further advance aluminum's position as the world's fastest growing metal.

Supplying U. S. industries with primary aluminum from Canada

Aluminium Limited *Sales, Inc.*

630 FIFTH AVENUE • NEW YORK 20, N. Y.

CLEVELAND • CHICAGO • DETROIT • LOS ANGELES • BUENOS AIRES • SÃO PAULO

For Increased Production, Lowered Costs . . .

SPECIFY YOUNGSTOWN SHEETS AND STRIP

Batteries of modern forming presses are busy working around-the-clock to keep today's auto body production in high gear. In order to maintain their reputations for high product quality, leading producers specify Youngstown Sheets and Strip because they're a blend of the proper combination of tensile strength, surface finish, flatness and ductility. Our satisfied customers tell us they get:

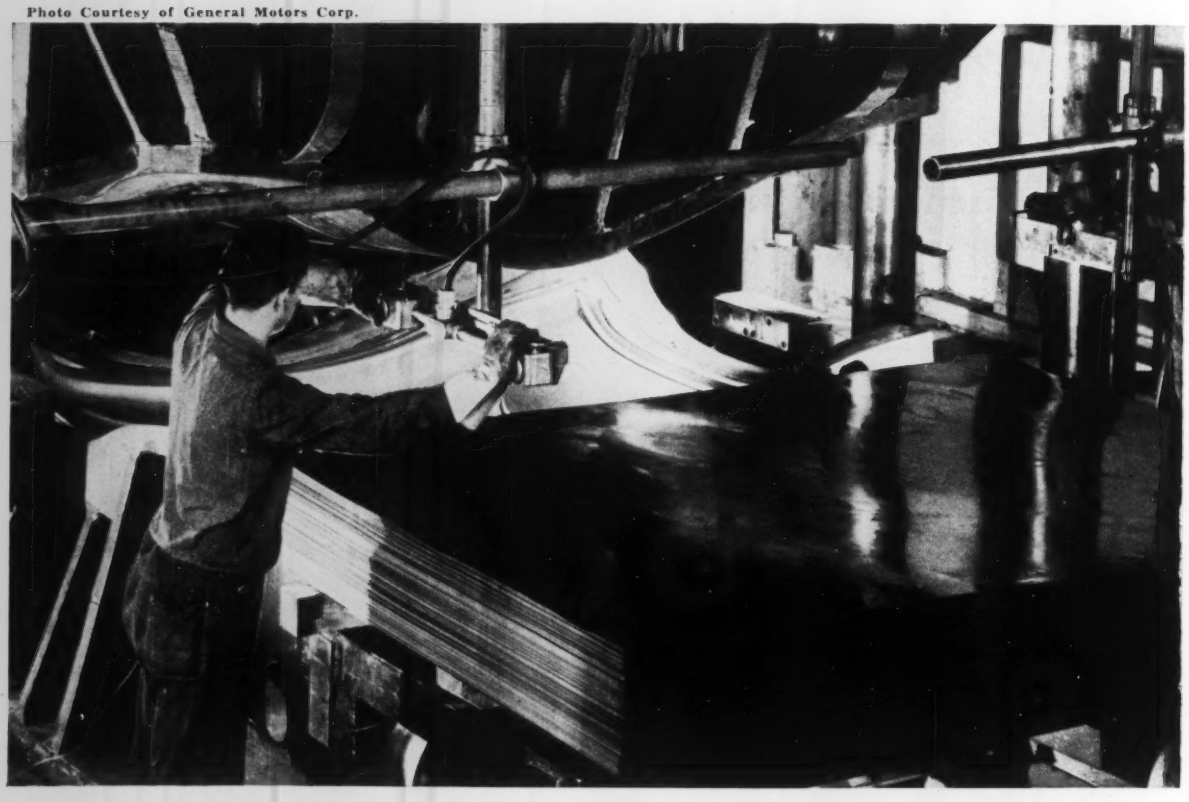
- Increased Over-all Production
- Lowered Reject Rates
- Faster and More Accurate Forming
- Decreased Fabrication and Die Costs

Why not make Youngstown your sheet and strip specification for improved product quality—and lowered production costs?

Youngstown Sheets and Strip are known throughout the stamping and drawing industry for their uniform high quality. Rigid quality control over every phase of their production provides a steel to meet **your** exact specifications. Since Youngstown's best—why settle for less?

For additional information or metallurgical field assistance, call or write your nearest Youngstown District Sales Office—or write directly to our Home Office.

Photo Courtesy of General Motors Corp.



COLD ROLLED SHEETS

QUALITY YOUNGSTOWN SERVICE

AND STRIP

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

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3 dependable products for the diesel industry

DE LAVAL IMO PUMPS

De Laval IMO pumps do a dependable job during long years of service. The reason is IMO design simplicity. De Laval IMO's have only three moving parts—smoothly intermeshing rotors that propel the fluid axially in a steady flow without churning, pocketing or pulsation. There are no reciprocating parts to wear or become noisy. Quiet, compact IMO pumps are excellent for direct-connected, high-speed operation. They can be furnished in capacities to 1,000 gpm and pressures to 1,500 psig.

DE LAVAL HYDRAULIC FAN DRIVES

De Laval Hydraulic Fan Drives for air cooled heat exchangers and cooling towers offer these important advantages. They *save* power since the fan operates at full speed only a portion of the time. They provide *accurate, automatic* control of engine jacket water temperature, and also assure complete operational flexibility. These units stay on the job for years. As shown, both IMO motor and speed reducer are mounted and factory aligned on a single bedplate.

DE LAVAL HIGH PRESSURE TURBOCHARGERS

De Laval turbochargers offer pressure ratios of 3:1 as well as higher compressor and turbine efficiencies than those found in conventional turbocharger systems. Output of heavy duty diesel, gas and dual-fuel engines may be doubled by De Laval turbochargers without increasing thermal loading. Exclusive Monorotor design offers a compact lightweight unit of sturdy construction. De Laval turbochargers are self-adjusting to engine loads, can be used on 4- *and* 2-cycle engines.

You'll find additional data in these De Laval Bulletins. Write for your copies.

DE LAVAL

Steam Turbine Company

TRENTON 2, NEW JERSEY

Close up of Acipco steel tubes used as hydraulic cylinders and rams in the new Dempster-Balester scrap metal press.

DEMPSTER BALESTER

New Dempster-Balester "750" features the Auxiliary-Compression Door and Skip-Pan Loader. New, longer charging box handles scrap as large as a complete auto body.

ACIPCO

Centrifugally Spun

STEEL TUBES

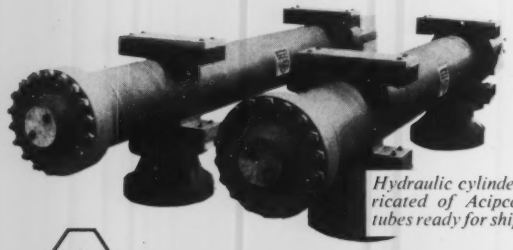
Selected for Newly Developed Press

Dempster Brothers, Inc., of Knoxville, Tennessee, is one of the country's leading manufacturers of baling equipment. They also manufacture equipment in the famous Dempster-Dumpster System of materials handling.

When Dempster Brothers' engineers required powerful hydraulic cylinders for their new "750" Dempster-Balester, they called on Acipco. Working with Dempster Brothers' creative engineering staff, Acipco supplied the two main hydraulic cylinders, completely fabricated and assembled, for this new, more economical press.

The Dempster-Balester main cylinders are examples of the extra advantages you get when you specify Acipco centrifugally spun steel tubes for your application. In addition to getting high quality tubes with the exact physical, metallurgical and chemical properties your application requires, you get the benefits of expert technical assistance and Acipco's combination of complete facilities and manufacturing competence.

If you manufacture or design products requiring tubular steel, your nearest Acipco distributor will be glad to supply information about Acipco steel tube applications in your field.



Hydraulic cylinders fabricated of Acipco steel tubes ready for shipment.

SIZE RANGE: Lengths up to 16′— longer lengths by welding tubes together. OD's from 2.25″ to 50″; wall thicknesses from .25″ to 4″

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steels; plain carbon grades and special non-standard analyses.

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ACIPCO

Special Products Division

BIRMINGHAM 2, ALABAMA

He moves a 30-oz. lever; the Gerlinger moves 30,000 lbs.

Where extra power is needed to lift, move and stack capacity loads up to 40,000 pounds, Gerlinger giants like this one do the job like no other fork lift trucks built. And do it with instant fingertip control!

More and more industrial plants, mills and foundries are finding out that top production and profits go hand-in-hand with the mass-handling efficiency you get with a job-proved Gerlinger.

You'll see your investment pay off almost immediately—made possible through Gerlinger features like these:

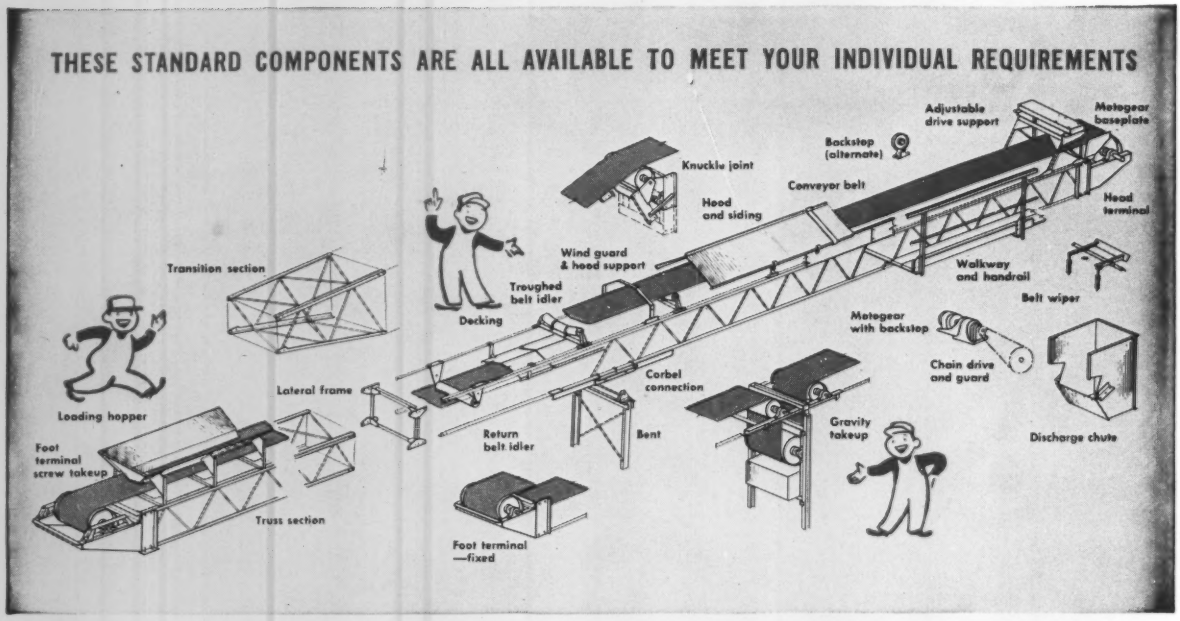
- *Pivotal-mounted steering assembly* —stabilizing load on any road
- *One-lever lift-tilt control* —positioned for safer operation
- *Counter-active weight distribution* —better traction, maneuverability
- *Heavy-duty steel channel frame* —bonus years of reliable service
- *Maximum-power torque converter* —smoother driving, less wear

New records of production and profit are the usual report when Gerlinger Fork Lift Trucks are on the job. Get latest catalog and see the many ways you will benefit. Write Gerlinger Carrier Co., Dallas, Oregon.

Leaders for 38 years in building Fork Lift Trucks and Carriers

TOWMOTOR - GERLINGER
THE ONE-MAN-GANG

Gerlinger Carrier Co., Dallas, Oregon, is a subsidiary of Towmotor Corporation, Cleveland, Ohio



NOW! The advantages of engineered belt conveyors in a LINK-BELT

PRE-BILT PACKAGE

easy selection

Your Link-Belt representative will help you select the best combination of PRE-BILT sectional belt conveyor components.

Standard 18, 24, 30 and 36-inch widths need no special engineering

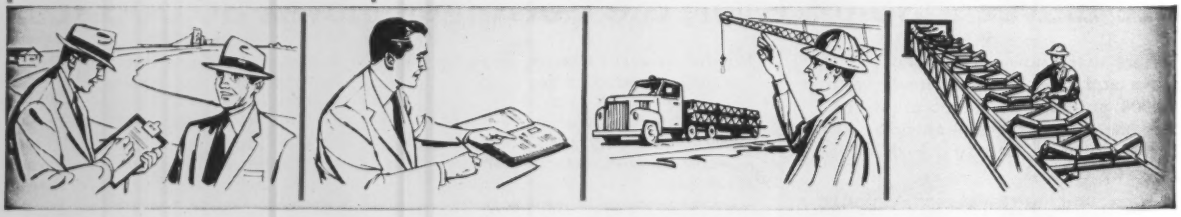
Here's an economical, standardized belt conveyor "package" . . . ready to meet the majority of belt conveyor needs and perform dependably for years and years. It combines standard Link-Belt products with sectional truss frames and steel supporting bents.

Book 2579 has further data on Link-Belt PRE-BILT conveyors . . . with drives up to 40 hp and 24 and 42-inch truss depths. Write today, or ask for a copy at your nearest Link-Belt office.

LINK-BELT

14.114

BELT CONVEYOR EQUIPMENT



prompt quotations

He will prepare a comprehensive and accurate estimate of requirements for installations that permit "on-the-ground" survey.

simplified purchase

Parts are standardized, interchangeable, all available from one supplier. Link-Belt representative can furnish all data.

quick delivery

PRE-BILT conveyors are built at nine strategic locations throughout the country and are shipped from the plant nearest you.

fast installation

Can be readily handled by your own erectors in most cases. Link-Belt can also furnish complete erection service and supervision.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

Powder-washing with the OXWELD C-62 Blowpipe—fast, efficient, economical.

Another Foundry Goes Modern!

No costly, time-consuming chipping and grinding here.

This foundry has gone modern . . . with powder-washing.

Powder-washing is the fastest, most efficient way to remove fins, pads, sand inclusions, and other defects from casting surfaces.

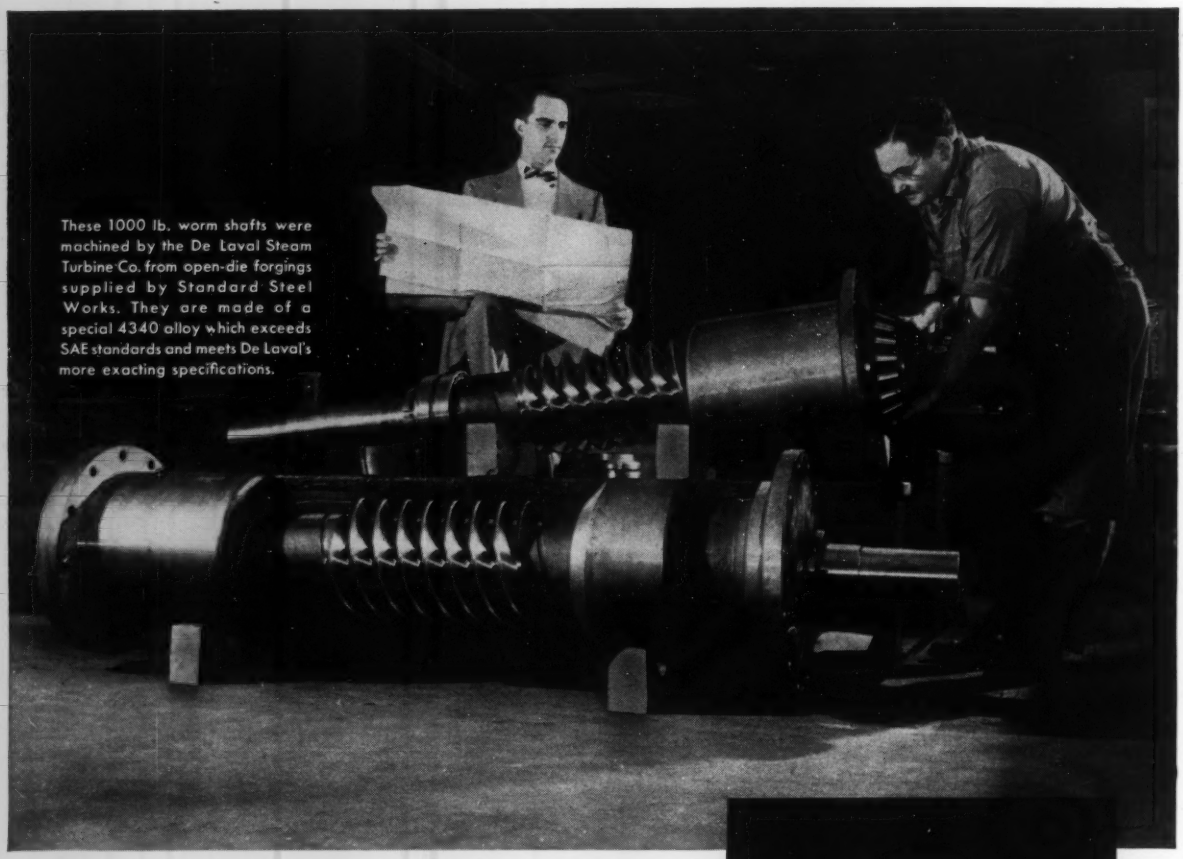
THE RESULT? *Increased production and profits!*

Call your nearby LINDE representative or write for more information today.

LINDE COMPANY DIVISION OF **UNION CARBIDE** CORPORATION

30 East 42nd Street, New York 17, N. Y.

"Linde," "Oxweld," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.



These 1000 lb. worm shafts were machined by the De Laval Steam Turbine Co. from open-die forgings supplied by Standard Steel Works. They are made of a special 4340 alloy which exceeds SAE standards and meets De Laval's more exacting specifications.

"It used to take us 12 weeks to get the required forgings for these worm shafts. We now get them in 6 weeks —from Standard Steel Works"

We accommodate De Laval's Mr. Schwarz in two ways so as to give him the service he wants: (1) We keep ingots and billets of the special high quality steel De Laval demands on order point—we can meet even the largest requirements on short notice; (2) each forging is tested and inspected—the product of complete and precise quality control. Mr. Schwarz knows he can expect not only service, but also quality when he orders forgings and castings from us.

Mr. Schwarz is just one of many industrial executives who have been impressed with the extra *service* we enjoy rendering. Not a month goes by that De Laval doesn't come to us with some special request which we can meet, and cheerfully. And hardly a day goes by that one of our many customers doesn't put our boast of personalized service to the test. Why don't you let us handle your next forging or casting requirement. You'll appreciate our service as well as our know-how. Write Dept. 2F.

"It's not unusual for me to be invited out on the floor to talk with the men who are actually making castings and forgings for us. In my opinion it's the personal interest which the men at Standard take in a customer's order that lies behind the consistently excellent service they render," *says E. T. Schwarz, Director of Purchasing, De Laval Steam Turbine Co., Trenton, N.J.*

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

Hamilton press line expanded to include medium size presses

Pictured above is a new Hamilton Gap Press recently installed at the Eaton Manufacturing Company, Cleveland, Ohio. This new large-bed press stamps out the larger grille guards which the latest model cars are calling for.

The capacity of this press is 250 tons and the speed 28 to 30 strokes per minute. Bed area is 90 in. right to left; 36 in. front to back. It is one of a new line of single and double-crank presses ranging from 100-300 tons capacity.

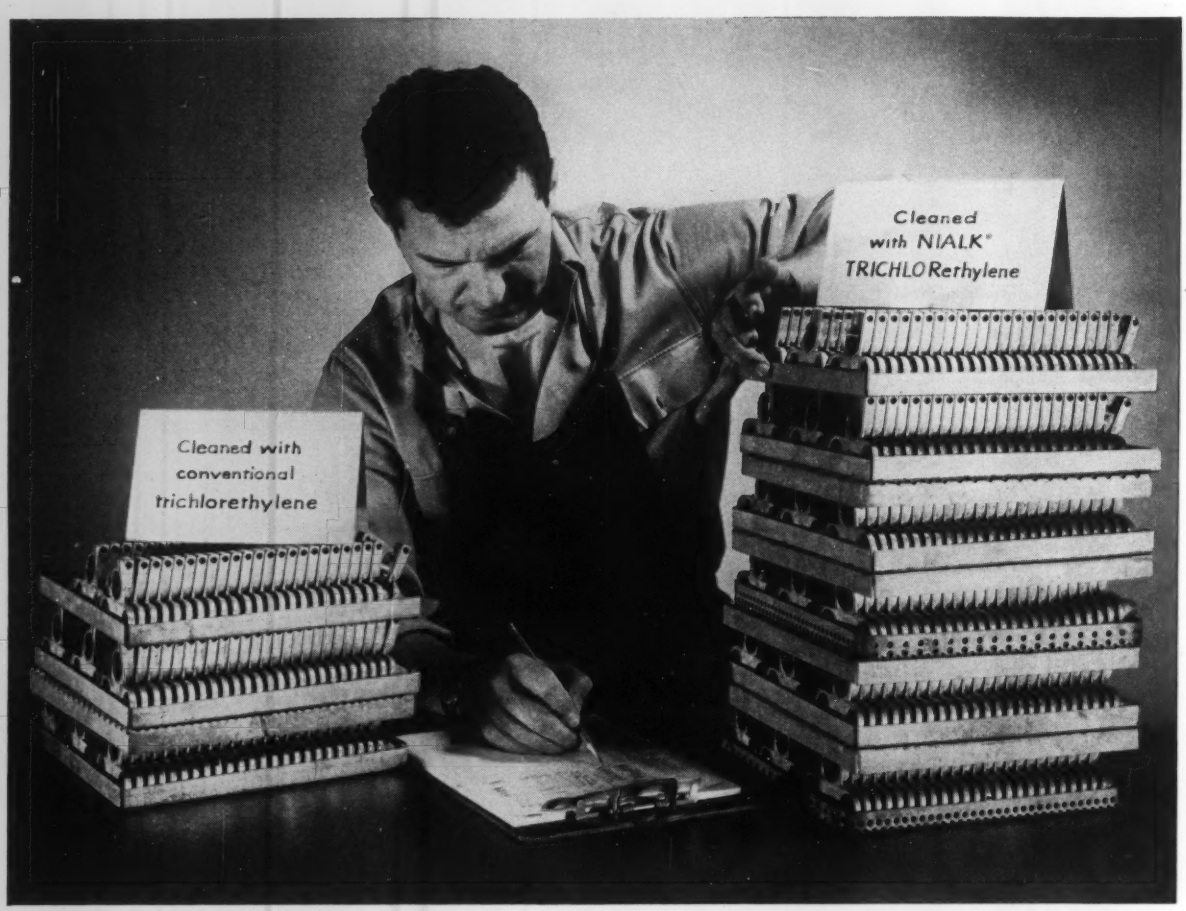
Write to Hamilton Division, B-L-H Corporation, for full information and specifications on this new line of heavy duty Hamilton presses.

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON



Operator using NIALK *TRICHLORethylene cleans more parts, because* NIALK *has* **psp** *which prevents acid contamination, reduces number of cleanouts.*

Why you get more effective degreasing when you use Nialk® TRICHLORethylene with psp

There's a difference—a big, cost-cutting difference—between NIALK TRICHLORethylene and conventional vapor-degreasing solvents.

Light, heat, air, acids, and active metals such as aluminum, given time, can break down improperly stabilized trichlorethylene, making it unfit for further degreasing.

Only Nialk TRICHLORethylene has psp

The stabilizer in NIALK TRICHLORethylene has **psp**—permanent STAYING power. It's neutral, non-alkaline. You *never* have to replenish it.

Only NIALK has this *permanent staying power*. Even after repeated distillations, its unique stabilizer prevents acid formation and other causes of breakdown. NIALK works equally well with *all* metals.

psp means cheaper degreasing... here's why

You don't have to clean out your degreaser nearly so often with NIALK TRICHLORethylene. You can degrease many more parts between cleanouts.

The NIALK stabilizer actively retards formation of degradation products in your degreaser—cleanouts are easier, faster.

Get proof of Nialk's cheaper, safer degreasing

See for yourself how NIALK TRICHLORethylene with **psp** stays stable, keeps cleaning efficiently long after other solvents have lost their punch. Write on your business letterhead for a revealing resumé of comparative metallurgical tests on the five leading brands.

HOOKER CHEMICALS PLASTICS

8-1813

HOOKER ELECTROCHEMICAL COMPANY

1206 UNION STREET, NIAGARA FALLS, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

Manufacturers of VIRGO® DESCALING SALT, VIRGO ELECTROLYTIC SALT, VIRGO MOLTEN CLEANER

Got a pain in the neck?

IF GRINDING PROBLEMS ARE GIVING YOU A PAIN IN THE NECK, SWITCH TO CINCINNATI (PD)° WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that *can save you money . . . and increase your production.*

And we're definitely not sticking out our neck when we make these claims, because through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.* So, we think you'll agree it's worth investigating CINCINNATI (PD) WHEELS right away.

Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

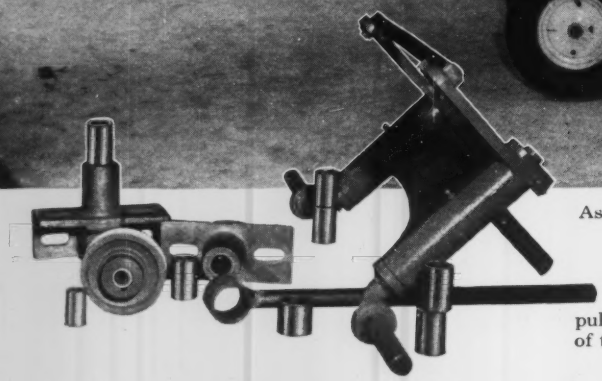
Remember—*only* CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION.
°Trade Mark Reg. U.S. Pat. Off.

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

CINCINNATI° *Grinding Wheels*

Assembly line for the Beaver Riding Tractor



Johnson Bronze bearings are used in the pulley, pitman arm bracket and front axle housing of the Beaver Riding Tractor

Hard-Working Beaver Uses Maintenance-Free Johnson Ledaloyl Self-Lubricating Bearings

When the Baird Machine Co., of Stratford, Conn., decided to produce the versatile Beaver Riding Tractor, it represented quite a change from their well-established line of heavy machinery. The skill acquired in the manufacture of durable machines weighing tons had to be turned to building a tractor weighing only 430 pounds.

New problems soon found familiar solution, however, as Johnson Ledaloyl self-lubricating bearings were called upon to provide rugged, maintenance-free service at vital points. "When we started our tractor line we didn't have to look far for what we needed," says Mr. Carl F. Johnson, Purchasing Agent for Baird. "We simply called our distributor, who already was stocking the desired sizes of Johnson bearings. We were familiar with Johnson bearings, since we were using them in our heavy manufacturing division."

Since the Johnson distributor maintains adequate stocks of bearings, Baird never worries about inventory. A phone call replenishes the supply on any item the same day. Although Baird never had occasion to use it, they know that Johnson field engineering service is readily available in case of need.

Your Johnson distributor carries a large stock of standard precision bearings in three basic types. He will be glad to help you to improve your product while lowering the cost with standard Johnson bearings

JOHNSON Bearings

Johnson Bronze

505 South Mill Street • New Castle, Pa.

GRAPHITED
over 175 sizes

GENERAL PURPOSE
over 900 sizes

UNIVERSAL BRONZE BARS
over 400 sizes

LEDALOYL
over 400 sizes

ELECTRIC MOTOR
over 350 sizes

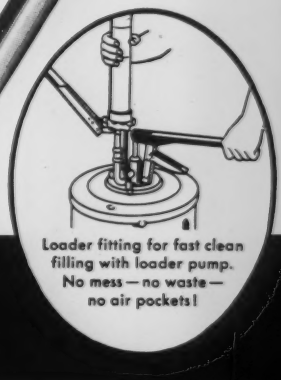
10,000 LBS. OF POWER

for even ordinary lubrication jobs!

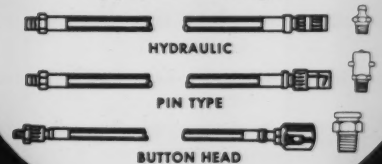
FAST, EFFICIENT HEAVY-DUTY
ALEMITE HAND GUNS

This rugged Alemite lever-type gun is packed with power and superior features for super performance in industrial lubrication! Develops 10,000 lbs. pressure . . . more than enough for ordinary lubrication jobs—with plenty of reserve power for "tight" bearings! Handles all regular pressure gun greases. Long-operating handle for maximum leverage. Loader fitting permits fast, clean filling (or gun may be filled by suction). Capacity, 1 lb., outlet, ⅛" p.t.

Heavy-duty Lever Gun
Model 1056-SE



Complete line of adapters and hose for all types of fittings!



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Division of STEWART-WARNER CORPORATION

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Please send me your complete catalog on Alemite lubrication equipment for industry.

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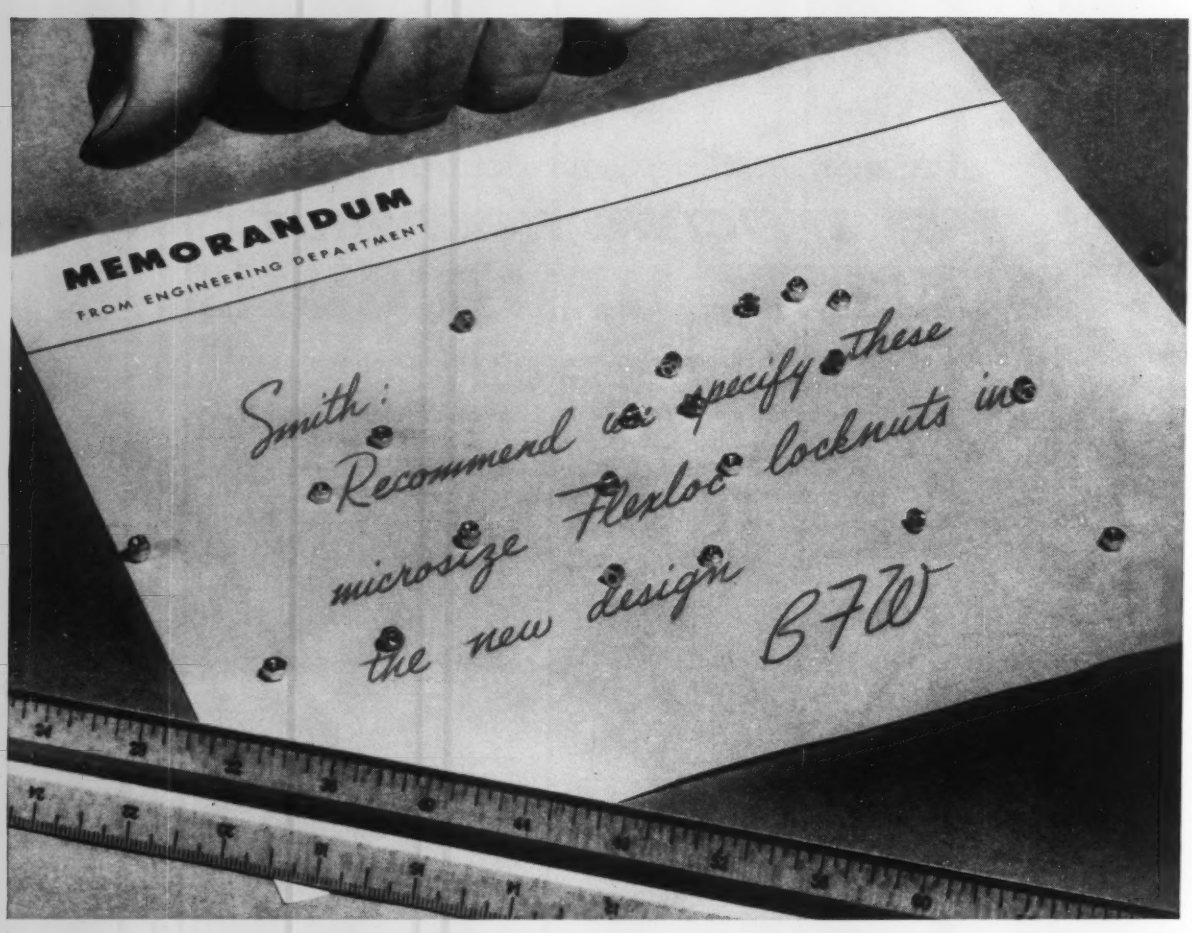


Microsize FLEXLOC locknuts help you design smaller assemblies and fasten them securely

SIZE	Across Flats MAX.	Across Flats MIN.	Hex. Height REF.	Across Corners MIN.	Height REF.
0-80 NF-3B	.111	.107	.046	.121	.075
1-64 NC-3B	.127	.123	.056	.140	.090
1-72 NF-3B	.127	.123	.056	.140	.090
2-56 NC-3B	.158	.153	.067	.176	.105
2-64 NF-3B	.158	.153	.067	.176	.105
3-48 NC-3B	.190	.183	.071	.210	.120
3-56 NF-3B	.190	.183	.071	.210	.120
4-40 NC-3B	.190	.183	.071	.210	.120
4-48 NF-3B	.190	.183	.071	.210	.120

Standard microsize FLEXLOC locknuts are available in brass (plain or cadmium plated) and aluminum (plain or chemically treated) for temperatures up to 250°F; in alloy steel (plain or cadmium plated) and 18-8 stainless steel (silver plated) for temperatures up to 550°F.

STANDARD PRESSED STEEL CO.

FLEXLOC® LOCKNUT DIVISION SPS JENKINTOWN PENNSYLVANIA

Microsize FLEXLOC locknuts save space and reduce weight in electronic equipment, instruments, servomechanisms, and other small assemblies in which weight and bulk are important design considerations. Microsize FLEXLOC locknuts are smaller and lighter than regular FLEXLOCS of the same nominal diameter. They permit smaller mating joints or flanges —with no loss in holding power or convenience of assembly.

Like regular FLEXLOCS, microsize FLEXLOC locknuts are of one-piece, all-metal construction. No inserts to pop out or deteriorate; nothing to put together, come apart or get lost. FLEXLOCS lock and stay locked wherever wrenching stops. You can use them as locknuts or stop nuts. Vibration will not loosen them and they can be used many times over.

For more information on microsize FLEXLOC locknuts (or microsize FLEXLOC self-locking clinch nuts), see your local FLEXLOC distributor or write STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

Please and

PROTECT EVERY WORKER*

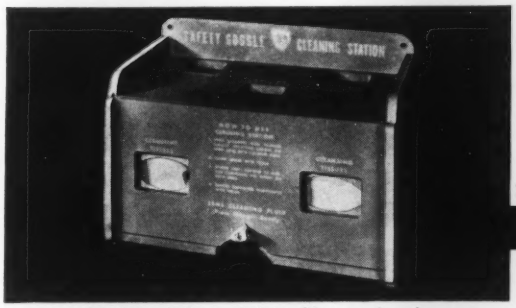
with Comfortable, Engineered AO F5100 Safety Glasses!

(*Who needs impact protection)

Here are our popular metal frame Ultrascopic Safety Glasses with many new features. In comfort, safety and styling (which makes the device willingly worn) there is no better eye protection. Specify the AO F5100 — reduce accident costs!

NEW FEATURES INCLUDE:

- Complete range of eye sizes (42, 44, 46, 48)
- Complete range of bridge sizes (18, 20, 22, 24, 26)
- 2 temple styles in all lengths. Comfort cables for both side shield and non side shield models, spatula temples for latter
- Screen, clear acetate and green acetate side shields
- Clear and Calobar 6 curve lenses



To be safe keep Safety Glasses clean!

AO 750 LENS CLEANING CABINET

Stationed at strategic plant locations, these cabinets give workers everything needed to keep safety glasses at peak visual efficiency. Cabinet is a small compact unit, providing all necessary cleansing and anti-fog materials. Made of selected hardwood, safety green lacquered finish. 12″ long, 9″ high, 6″ deep. Contains 6 oz. bottle 750B and sprayer.

750S: Bottle can be used with AO #750F Fluid or AO 350AF Super-Clear anti-fog-cleaner fluid.

750T Cleansing Tissue: 2 boxes each with 120 sheets supplied. 2 openings in front of cabinet permit easy detachment of single sheets (no waste).

Tissue Disposal: 2 openings at top of cabinet provide for disposal, keep area neat and tidy.

111 Anti-Fog: 1 oz. jar supplied with cabinet. AO 350AF Super-Clear available on special order.

American Optical Sweatbands increase worker comfort and efficiency, keep sweat out of eyes — prevent accidents — for pennies! Check your needs.

Always Insist on AO Trademarked Safety Products. Your nearest American Optical Safety Products Representative can supply you.

SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL CITIES

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

Steel's Strength, Copper's Fluidity (sealing ability) and corrosion resistance all are combined in Sterling Automotive Mfg. Co.'s use of Thomas copper-coated steel strip. By lubricating dies during punch press forming, copper coating boosted die life by 33%. The Chicago company turned to Thomas electro-coated strip to give its auto head gaskets extra strength needed for today's high-compression engines.

20 Million Shoe Horns a Year are made in Crawfordsville, Ind., plant of Steel Industries, Inc., where Thomas Strip saves up to 40% of production cost. From nickel-coated Thomas Strip, shoe horns get bright, shiny finish with only ball-burnishing after forming.

New Ways To Cut Costs With Thomas Strip

How Six Manufacturers Use These Production Ideas For Better Products

Ray-O-Vac Company saves $100,000 a year at its Clinton, Mass., Flashlight Division, by using Thomas copper-coated strip for flashlight cases. Compared to brass, Thomas deep-drawing strip is fabricated faster, requires less processing — also, copper coating lubricates dies and provides good chrome-plating base.

Manufacturers pictured on these pages chose Thomas Strip because it cuts costs, improves products—gives them higher profits and increased sales.

Pre-coated Thomas Strip is furnished ready for use with electroplated coatings of zinc, copper, brass, nickel, or chrome . . . or hot dip coated with lead alloy or tin . . . and coated with clear or colored lacquer.

Uncoated Thomas Strip products include low carbon, alloy and high carbon spring steel grades. All are available in a wide range of sizes, gages, tempers and finishes.

You also can get cold rolled Thomas Strip plain or coated with a rolled-in pattern design of your choice.

All Thomas Strip products can save you money and enhance your product in six important ways:

- **Fabricates Easily**—coated steels stand fully as much fabrication as uncoated strip.

Increased Saleability and Profits followed Pioneer Can Co.'s switch from lithographed tin plate to brass-coated Thomas Strip with a rolled-in pattern design. Pioneer's waste baskets and decorative cans gained in durability, beauty and re-use value. They command a higher price now and return more profits.

General Electric's styling of its deluxe range made at Appliance Park calls for liberal use of pattern-rolled Thomas Strip. Deeply rolled rib design, satin chrome-coated, is used on oven door—adds distinctive modern touch to GE's Keyboard Ranges. Thomas offers many design patterns in plain or coated steels.

- **Longer Die Life**—most coatings lubricate dies, reduce wear and increase tool life.
- **Maximum Pieces Per Pound**—precision rolling to extremely close size tolerances gives more square feet of strip per ton.
- **Lower Plating Costs**—coatings can serve as final product finish or as base for further plating or painting.
- **Speeds Fabrication**—Thomas Strip coatings eliminate costly intermediate fabricating steps such as cleaning, buffing, even plating.
- **Steel's Strength and Economy**—are combined with beauty and utility of more expensive metals.

All the savings and benefits Thomas Strip specialties are giving to fabricators shown here are available to you. A national sales staff—familar with design and fabrication advantages of Thomas Strip is ready to serve you.

Write for samples, and additional cases of users' actual experiences with Thomas Strip Products. Do it today.

Stack 'n Add is another new product of Quaker Industries, Kenosha, Wisc. The smart sectional shelving gets strength, beauty and economy through use of Thomas brass-coated, buffed and lacquered strip for upright supports. Electro-coated Thomas Strip eliminates expensive pre-forming preparation, as well as costly plating.

Thomas Strip®

Division

Pittsburgh Steel Company

Grant Building · Pittsburgh 30, Pennsylvania

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Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
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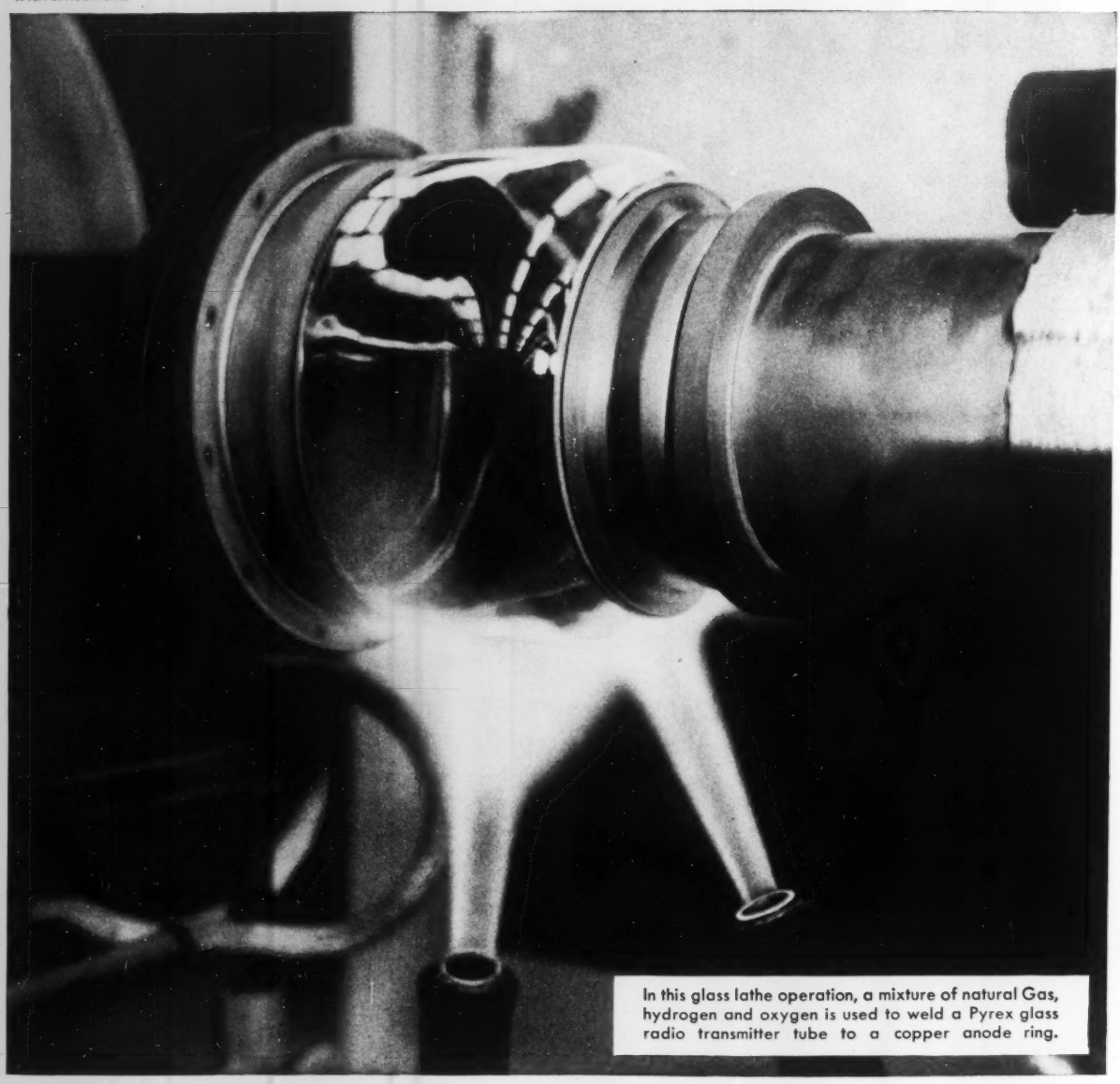
(Advertisement)



In this glass lathe operation, a mixture of natural Gas, hydrogen and oxygen is used to weld a Pyrex glass radio transmitter tube to a copper anode ring.

RCA welds glass to metal at over 2000° F. ...thanks to GAS

Natural Gas is used to weld glass to metal in the production of radio and television tubes of many types at the RCA Tube Division plant in Lancaster, Pennsylvania.

To effect the weld at over 2000° F., a mixture of natural Gas, hydrogen and oxygen maintains the high welding temperature on the Pyrex glass and metal parts as they rotate on a glass lathe. A Gas flame is then used to control and equalize the cooling of the glass down to the 900-600° F. range.

For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and superior results you get with Gas and modern Gas-fired industrial equipment. *American Gas Association.*

•

See Playhouse 90 with Julia Meade on CBS-TV. Watch local listings for time and station. Sponsored by your Gas Company and the Gas Industry.

WANTED 'A HARD JOB'

Wayne "W.B." Yarnell
Chief Engineer.

Saving the hours that are so vital to our customers in the primary metals field is a very important phase of our business. And no man in our 1200-man organization more typifies the high respect that all of us at CHICAGO CONCRETE CONSTRUCTION have for time saved than Wayne "W.B." Yarnell, Chief Engineer.

Not an ordinary job but one, nevertheless, that is typical of the type that CHICAGO CONCRETE CONSTRUCTION has developed a reputation for handling, is that of the mantle-up reline of a 26'-hearth blast furnace for which, a particularly-tight schedule was necessary. From blow-out to blow-in, the time allotted was a very short 36 days. The job not only consisted of completely tearing out and rebuilding this furnace, but also included the installation of the first complete system for proportioning air to the tuyeres.

By expertly analyzing the numerous jobs that had to be done, Wayne Yarnall coordinated the engineering and construction activities in such a manner that he had the respective work crews functioning with railroad-schedule tightness. Despite the vast complexities of installing this first air proportioning system, and despite the numerous operations that were involved in this complete tear-out-and-rebuild, the blow-in was made 34 calendar days after the furnace had been shut down.. two full days ahead of the previously-agreed-to-schedule!

Yes, where hours can mean the difference between a gain or a loss of thousands of dollars . . . and where experience, know-how and seasoned manpower are called for, the firm to remember is the firm who seriously advertises . . . WANTED - - - A HARD JOB!

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DIVISION OF CHICAGO CONCRETE BREAKING CO.

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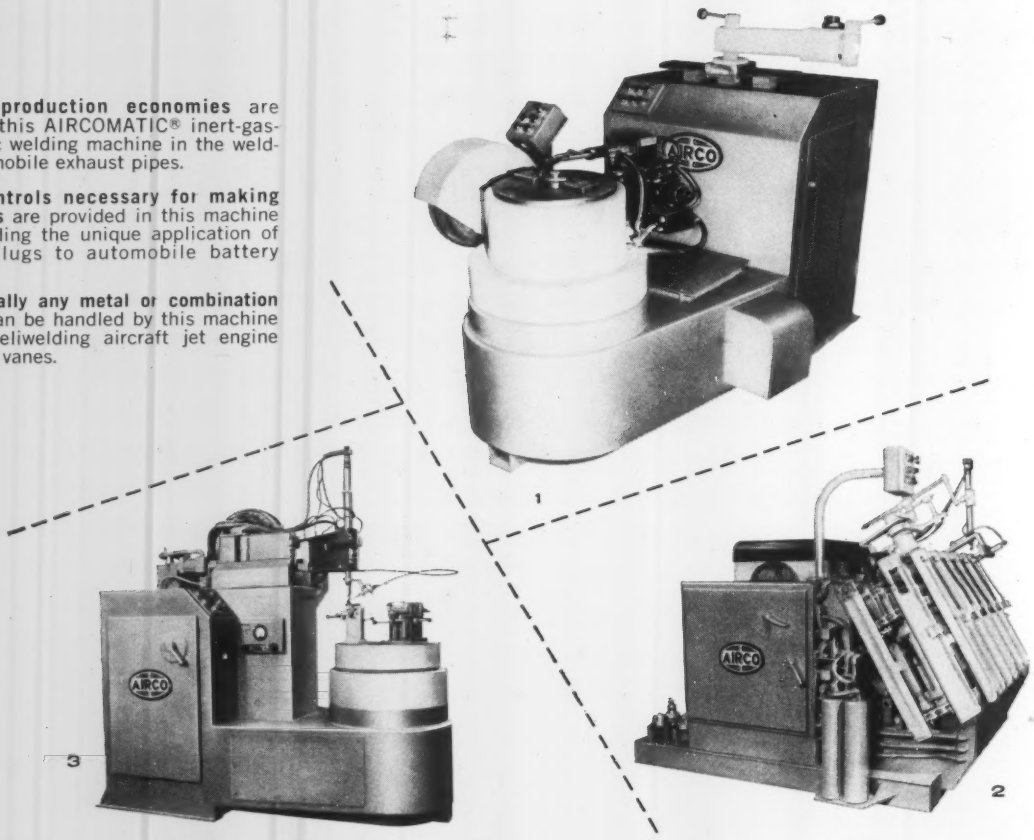
❶ **Many production economies** are offered by this AIRCOMATIC® inert-gas-shielded arc welding machine in the welding of automobile exhaust pipes.

❷ **All controls necessary for making sound welds** are provided in this machine for Heliwelding the unique application of aluminum lugs to automobile battery cables.

❸ **Practically any metal or combination of metals** can be handled by this machine used for Heliwelding aircraft jet engine turbine exit vanes.



available to you...

A completely packaged "welding-and-engineering" service

Airco's Machine Welding Department custom engineers automatic welding operations to your product design—accepts all responsibility for: welding processes, machine design, production procedures, installation, operating efficiency!

Airco's Machine Welding Department gives you practical guidance and assistance when you are considering semi-automatic or automatic welding operations in your plant or shop. The 36 projects already completed comprise a wide range of automatic welding applications.

No matter how large or small the job, Airco engineers are prepared to help you evaluate the various welding processes, select the most suitable machines and equipment for your job and develop efficient production-line procedures.

You get a completely engineered "package" from one source. You avoid cost of process studies, the confusion of dealing with numerous suppliers of component parts, the time wasted in working the "bugs" out of your automatic welding installation. Airco's Machine Welding Department co-ordinates processes, procedures and machines for smooth efficient operation. They will design, construct and install jigs and fixtures that will meet your manufacturing specifications at the lowest possible cost.

Learn how you can solve your production problems with a custom engineered automatic welding package at reduced cost. Write to: J. H. Berryman, Machine Welding Department, Air Reduction Sales Company, (address below), for complete information.

AT THE FRONTIERS OF welding PROGRESS YOU'LL FIND . . .

AIRCO®

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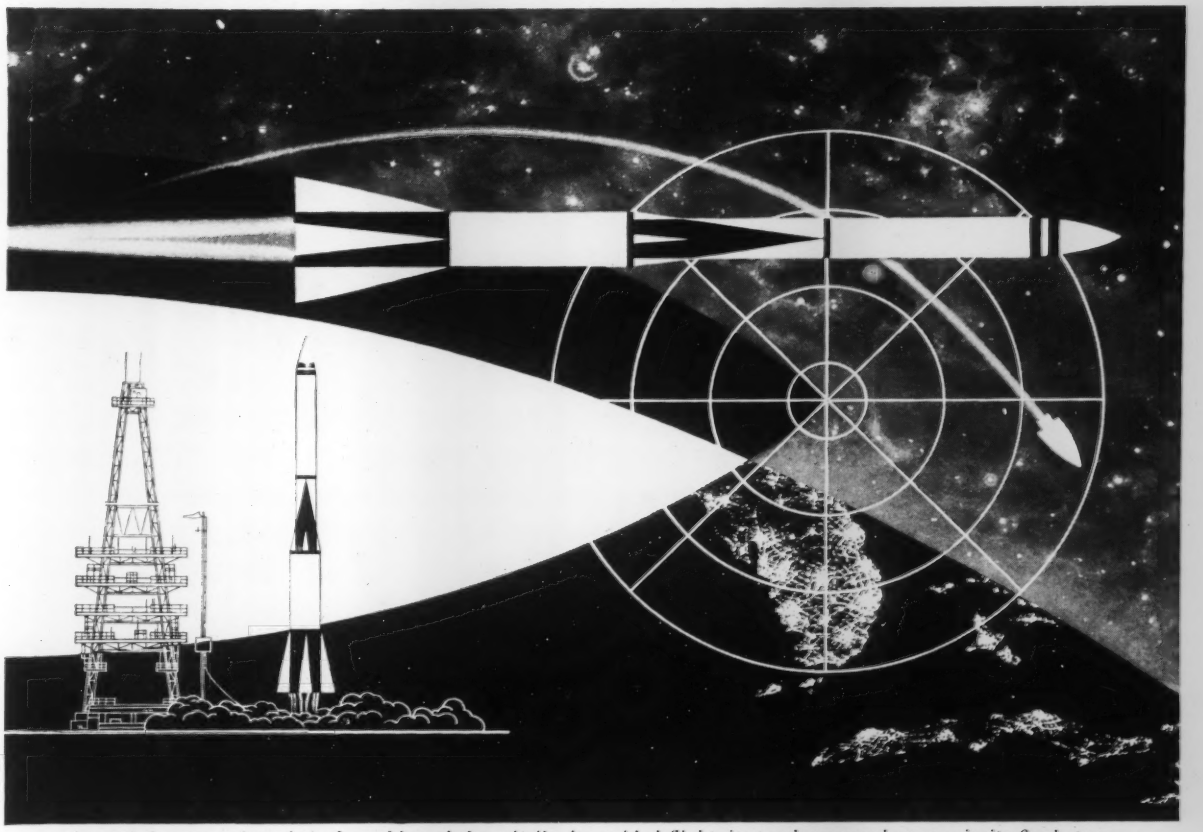
Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** — carbon dioxide — gaseous, liquid, solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetate, alcohols, and other synthetic resins.



An artist's conception of the launching of the missile, its guided flight, its track on a radarscope in its final stage.

Guiding a missile? Or a business?

For either one, you need COPPER!

You see a good many pictures these days of guided missiles. New *types* of missile are appearing.

Not one is launched without COPPER!

The scientists who design these delicate, electronic, lethal weapons . . . the plants that assemble them . . . the technicians who launch them . . . these may perhaps make no mention of the copper in them. But every time you see a guided missile . . . on TV, in a newsreel, in magazine and newspaper articles . . . you can say to yourself:

"*Copper* helped make this possible!"

For copper is essential to electronics and to the progress that is being made by electronics in our nation's defense, including guided missiles.

Copper's highly efficient electrical conductivity . . . copper's resistance to corrosion . . . copper's *integrity* . . . are some of the characteristics that make copper indispensable in guided missiles, *and invaluable in YOUR product!*

You can *trust* copper even when it's out of your sight. Working away, deep in some complicated automatic mechanism or in the simple thermostat on the wall of your home, copper *performs without fail.* And in your business, too, copper never fails to safeguard product-quality.

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RESEARCH ASSOCIATION
420 Lexington Avenue, New York 17

COPPER OR ITS ALLOYS PROVIDE THESE ADVANTAGES: Best conductor of electricity commercially available • Does not rust . . . high corrosion resistance • Best heat transfer agent of all commercial metals • Easy to machine, form, draw, stamp, polish, plate, etc. • Welds readily . . . excellent for soldering and brazing

What one form of power is cheaper today than in 1940?

Electricity. And if you operate electric industrial trucks, the cost is probably less now than when you bought them.

Isn't this a refreshing contrast to the rest of today's business-cost picture? And isn't this something to think about for the future? Other costs keep going up, up, up. But electricity has been coming down, down, down—for years.

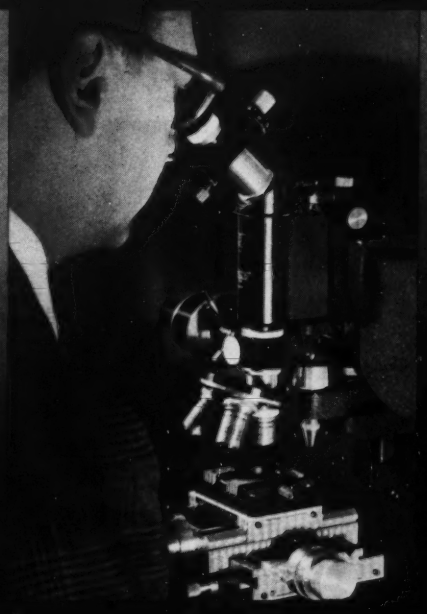
The result is that electric industrial trucks are a better power bargain today than they've ever been. And power savings plus overhead savings actually total hundreds of dollars per truck every year. This has been proved in thousands of cases in all types of truck service.

Here's how you save: You buy the power from your local electric company at low rates. Heavy duty storage batteries last for years without replacement. Cool-running electric motor-drive systems that seldom need maintenance—use no power at all when standing still. While first cost is higher, electric industrial trucks give you more than twice the useful life, according to national average figures. And it's a fact that of all the electric industrial trucks ever made in the U.S., about 90% are still on the job! That's real proof of service.

These are important cost considerations for up-to-date management men today. In addition, electric industrial trucks are easier to operate and make practically no noise—advantages especially appreciated by plant personnel. Have a talk with your nearby industrial truck dealer or salesman. He's listed in your classified telephone directory under "Trucks—industrial."

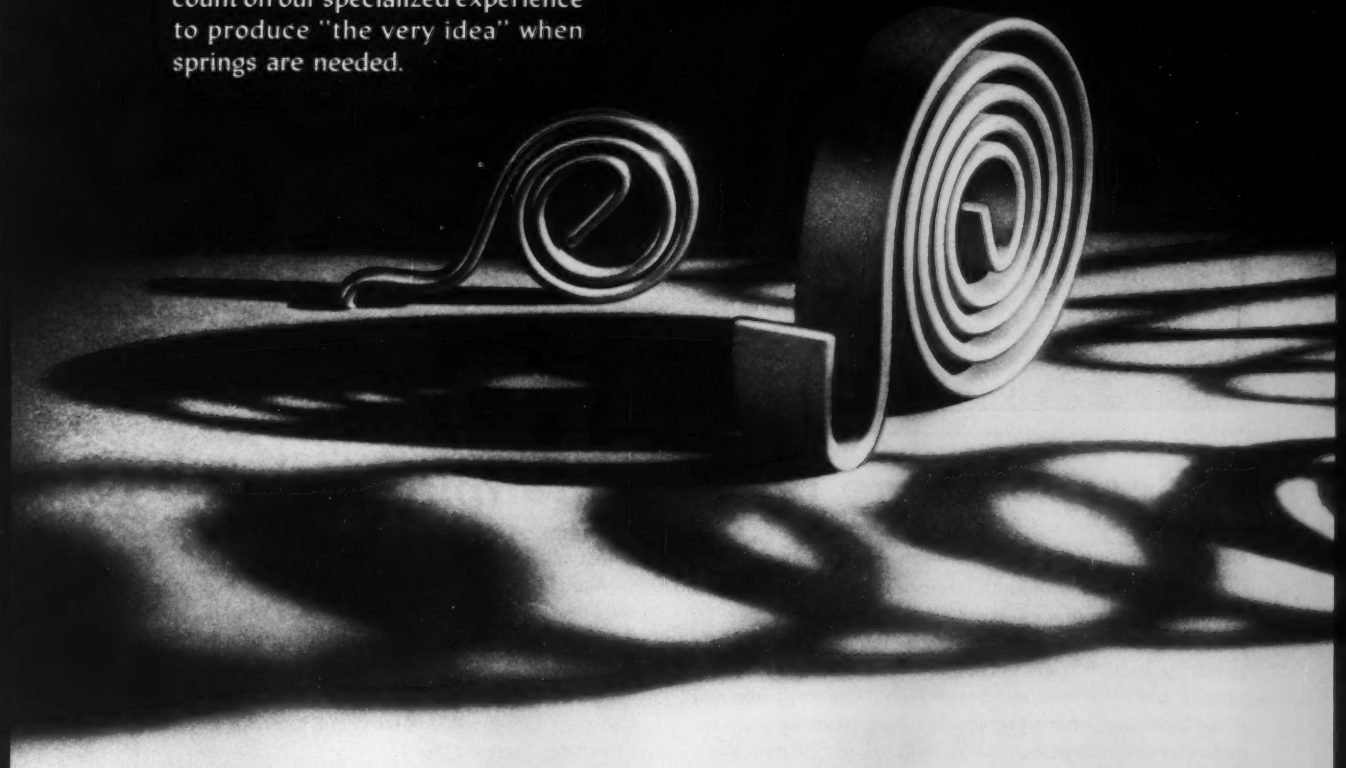
This message is presented as a service to industry by Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.

THE ELECTRIC STORAGE BATTERY COMPANY **Exide®**



IDEAS . . . into springs

During the thinking stage of new developments or improvements, count on our specialized experience to produce "the very idea" when springs are needed.



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World's Largest Manufacturers of Precision Mechanical Springs

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WALLACE BARNES STEEL DIVISION — Producer of High-Carbon Strip Steel

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from one hour to one minute...

HELIARC Cutting Whizzes Through Aluminum

One of the first aluminum fabricators to use LINDE's new HELIARC cutting process reveals savings of more than 95 per cent over conventional chipping methods—jobs normally requiring 1 and 5 hours to complete are whisked through in only 1 and 4½ minutes respectively. Graver Tank and Manufacturing Company reports beveling, grooving, shaping, and cutting are all performed on ⅝-in. thick, 52S aluminum plate at substantial time, space, and cost savings.

Incredible, but true: HELIARC cutting can attain speeds as high as 600 inches per minute, and cut aluminum in thicknesses up to 1½ inches. No special skill is required. A certified welder can do excellent cutting jobs after less than one hour of instruction.

Get the full story on revolutionary new HELIARC cutting. Call your LINDE representative, or write for free illustrated literature, Form 50,095.

LINDE COMPANY
Division of Union Carbide Corporation
30 East 42nd Street, New York 17, New York
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In Canada: Linde Company, Division of Union Carbide Canada Limited.

The terms "Linde," "Heliarc" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

P-86-0601

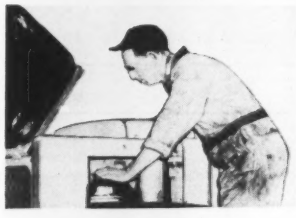
they all like ALLIS-CHALMERS fork lift trucks

here's why they like them

OPERATOR:

"Must have been engineered for the driver," says the operator of an Allis-Chalmers fork truck at a midwest foundry. "Shifting is handy and I like where the controls are located. Have plenty of room for driving."

Important controls are right where an operator would like to have them. Gauges are in plain sight, easy to read. Floor is clear, operator steps on or off either side.



SERVICEMAN:

"Finest truck from a mechanic's point of view," is the comment of the lift truck fleet serviceman at a midwestern plant. "In over 3,000 hours of operation, the Allis-Chalmers truck has caused no trouble at all."

It takes only 22 seconds to strip an Allis-Chalmers fork truck for servicing—only 22 minutes for two men to disassemble right down to the bare frame.

PRESIDENT:

"Would like you to know how well satisfied we are," writes the president of an eastern warehousing company. Operating up and down a steep ramp had caused exceptionally heavy clutch repair costs with older trucks, but "we have yet to experience our first clutch trouble with an Allis-Chalmers truck."

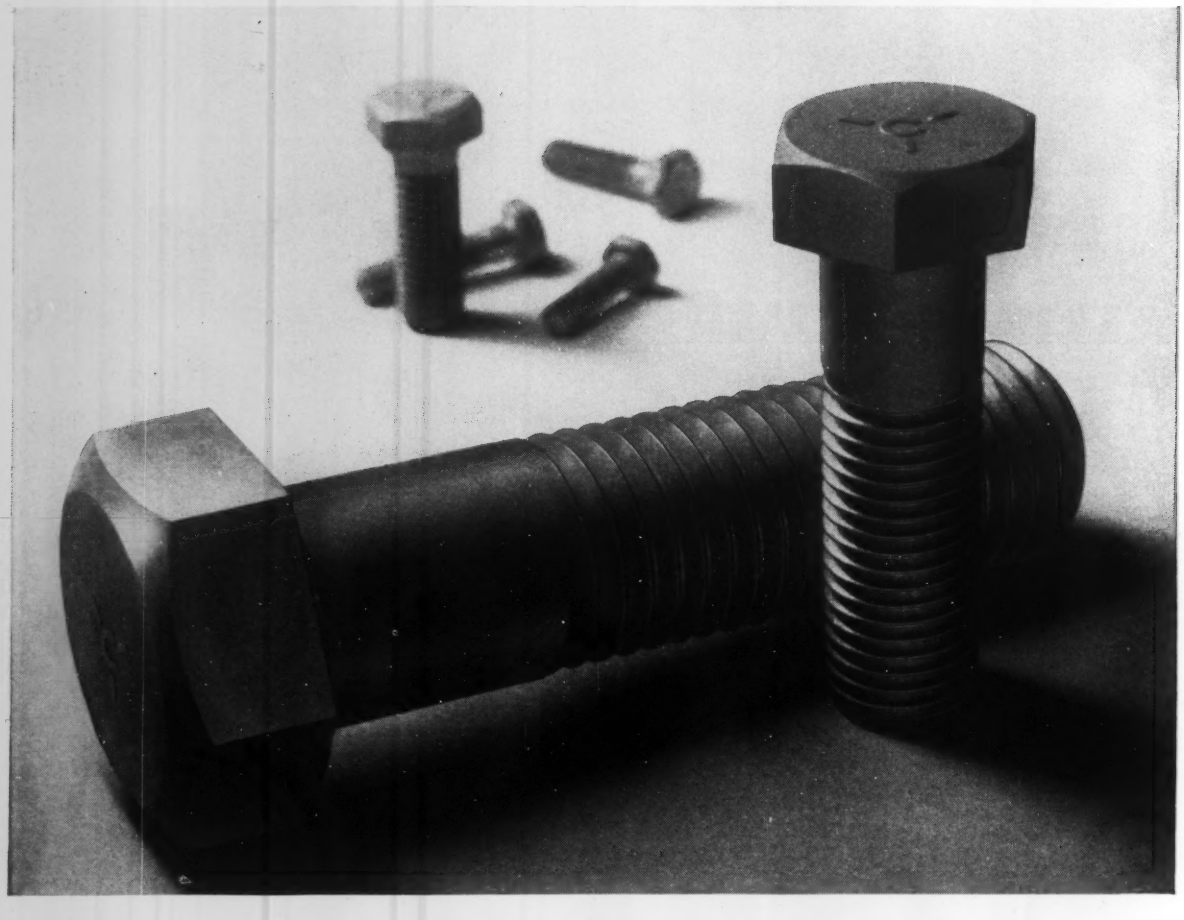
Allis-Chalmers fork lift trucks were the first with optional torque converter drive — which eliminates clutch problems, saves shifting, provides torque to handle steep grades with ease.

BH-37

Join the growing list of satisfied Allis-Chalmers fork truck users. You'll find it profitable in every way. See your dealer or write direct for more information on trucks to fit your needs.

MATERIAL HANDLING DEPT., BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS



Cleveland upset forged hexagon head cap screws make your assemblies stronger and safer

Cleveland's upset forging process puts an extra measure of fastener muscle into your assemblies. The flow lines in every hexagon head cap screw follow the contour of the head, eliminating the planes of weakness along which shear might occur under the dynamic stress of heavy impact and vibration.

Cleveland hexagon head cap screws are manufactured from a wide variety of steels and in many different tensile strengths. In most cases, a Cleveland standard will serve as well as a special and will be much less expensive. Check the chart at the right for the one best suited to your needs. Then see your local Cleveland distributor. He stocks Cleveland hexagon head cap screws in sizes and physical properties to meet the most exacting demands of modern machinery design. All standard size cap screws in bright and quenched and tempered steels are available without delay—alloy steels on short notice. And remember, your distributor is backed by the most up-to-date production facilities and the largest factory stock of hexagon head cap screws in the world.

TENSILE STRENGTHS OF CLEVELAND HEXAGON HEAD CAP SCREWS

Product	Size, in.	Tensile Strength, psi
Bright	Up to 7/16 incl. 1/2 to 1 1/8 incl. Over 1 1/8 to 1 1/2 incl.	85,000—105,000 75,000—100,000 65,000 min.
Quenched & Tempered (SAE Grade 5)	Up to 3/4 incl. Over 3/4 to 1 incl. Over 1 to 1 1/2 incl.	120,000 min. 115,000 min. 105,000 min.
Quenched & Tempered (SAE Grade 6)	Up to 5/8 incl. Over 5/8 to 3/4 incl.	140,000 min. 133,000 min.
Alloy (SAE Grade 7)	Up to 1 1/2 incl.	130,000 min.
Alloy (SAE Grade 8)	Up to 1 1/2 incl.	150,000 min.
Bright	Over 1 1/2 to 2 1/2 incl.	55,000 min.
Quenched & Tempered	Over 1 1/2 to 2 1/2 incl.	90,000 min.
Alloy	Over 1 1/2 to 2 1/2 incl.	125,000 min.

Note: Higher physicals, through use of selected alloys, can be supplied on special order.

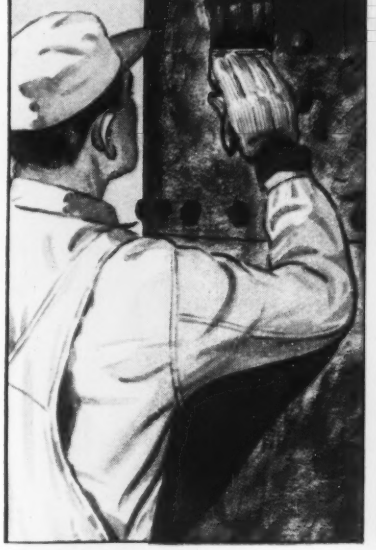
GET YOUR COPY NOW — Pocket-size card giving you physical properties of Cleveland hexagon and socket head cap screws and Cleveland Place bolts.

THE CLEVELAND CAP SCREW COMPANY
4444- 2 Lee Road, Cleveland 28, Ohio
WAREHOUSES: Chicago • Philadelphia • New York • Los Angeles

Three Rust-Oleum DIFFERENCES that save you time, money and metal!

GOES ON FASTER

No tedious surface preparations usually required — just scrape and wirebrush to remove rust scale and loose rust — then brush Rust-Oleum 769 Damp-Proof Red Primer right over the remaining rust.



STOPS RUST

Rust-Oleum's *specially-processed* fish oil vehicle works down through the rust into the tiny, microscopic pits in the bare metal where it drives out air and moisture to *stop rust.*

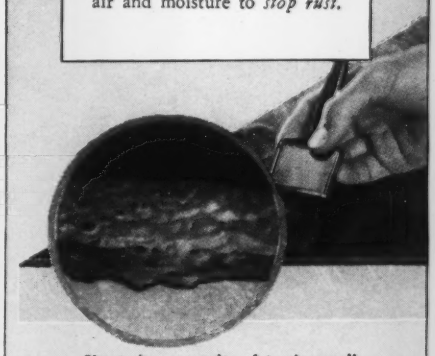
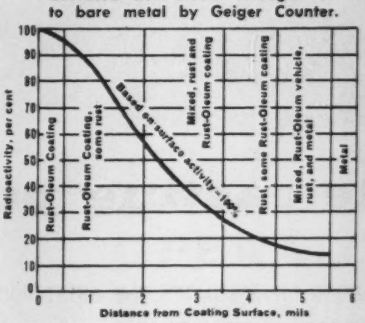
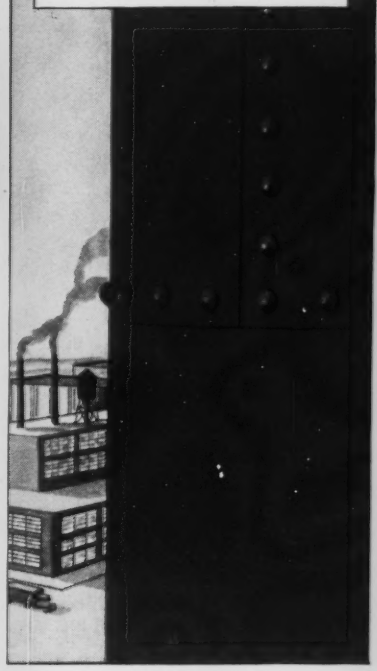


Chart shows results of tracing radio-activated Rust-Oleum through rust to bare metal by Geiger Counter.



LASTS LONGER

Applied over rust, Rust-Oleum lasts longer for the *over-the-years protection* you need. It resists sun, salt water, salt air, fumes, heat, humidity, moisture, weathering.



These are just a few of many important *differences* that separate Rust-Oleum from ordinary coatings. When you consider that Rust-Oleum covers approximately *30% more area,* depending upon surface condition and porosity . . . and the fact that Rust-Oleum finish coatings, with the same fish oil vehicle, are available in nearly every color for *double protection* . . . it's just good, common sense to use Rust-Oleum. Prompt delivery from Industrial Distributor stocks. Write for illustrated literature with color charts.

RUST-OLEUM®

STOPS RUST!®

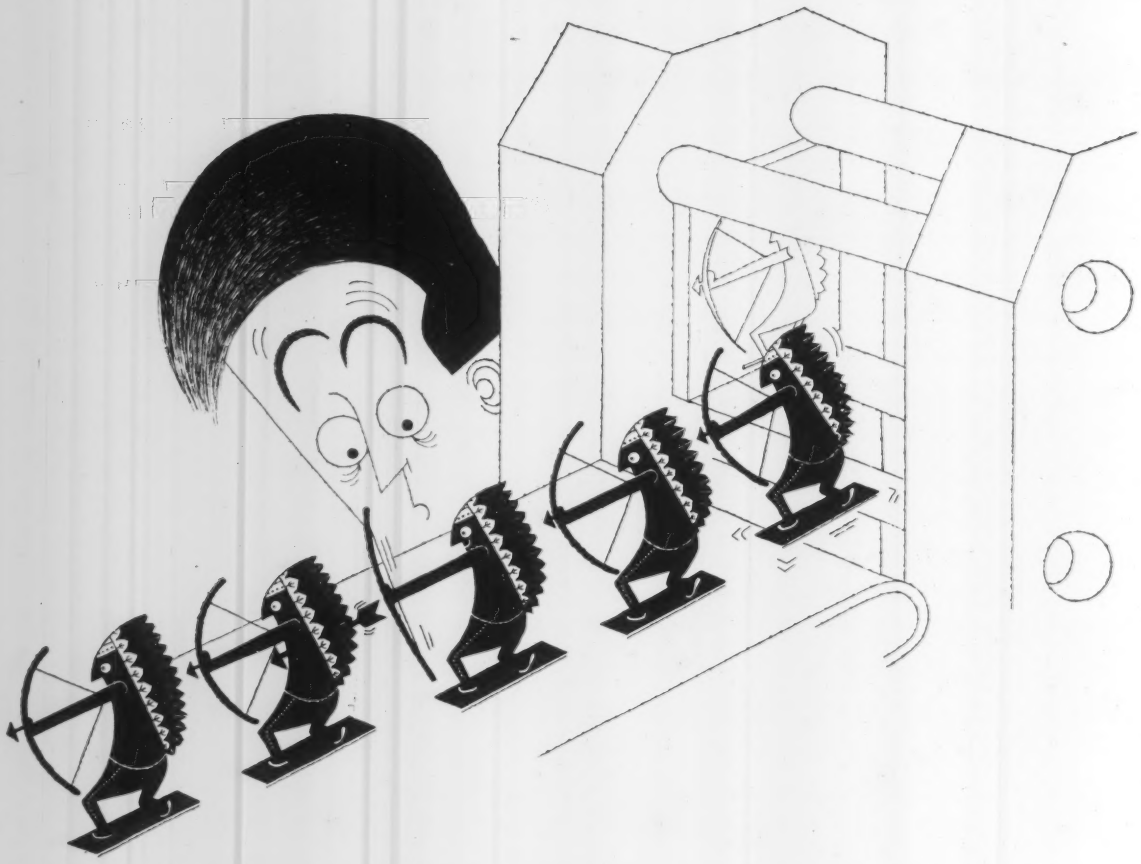
Rust-Oleum is distinctive as your own fingerprint. Accept no substitute.

ATTACH TO YOUR LETTERHEAD — MAIL TODAY

Rust-Oleum Corporation
2511 Oakton Street • Evanston, Illinois

- ☐ Complete literature with color charts.
- ☐ 30-page report on Rust-Oleum penetration.
- ☐ Nearest source of supply.

Rust-Oleum and Stops Rust are brand names and registered trademarks of the Rust-Oleum Corporation.



Got a die casting problem?

THEN CONSIDER CRUCIBLE NU-DIE V DIE CASTING DIE STEEL. IT'S THE OUTSTANDING DIE STEEL — AND IT'S QUICKLY AVAILABLE FROM LOCAL CRUCIBLE WAREHOUSE STOCKS.

Crucible NU-DIE V is a particularly good choice for aluminum and magnesium die casting dies, or long run zinc dies or die inserts. It resists washing or heat checking. And every piece of Crucible NU-DIE V is ultrasonically inspected to insure that the steel you buy is of the highest die steel quality.

Press forged blocks are regularly stocked at Crucible warehouses, in a wide variety of sizes. And there are dozens of other tool steel grades for you to choose from.

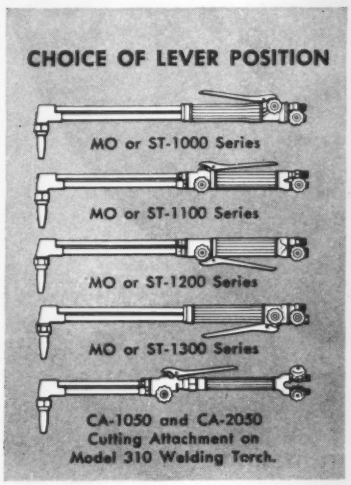
Crucible is the only specialty steel producer *fully integrated to the point of use.* That means control and responsibility from raw material to warehouse delivery to you.

STOCKS MAINTAINED OF:
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, Hy-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

CRUCIBLE WAREHOUSE SERVICE

Crucible Steel Company of America

General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Grand Rapids Harrison • Houston • Indianapolis • Los Angeles • Milwaukee • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.



Select either Monel (MO) or forged bronze (ST) head; available in four lengths: 21", 27", 36" and 48", with 90°, 75° and 180°. 45° on ST models only. Same design features contained in cutting attachments, with forged bronze head.

OPERATORS PREFER
this torch for hot, tough jobs!

LICK YOUR HOTTEST JOBS

. . . solid stainless steel mixing tube absorbs heat slowly, keeps gases below flashpoint.

LAST LONGER UNDER ROUGH, TOUGH USE

. . . because they're made of toughest materials . . . special heat resisting bronze heads, forged brass bodies.

EASIER TO HANDLE, EASIER TO MAINTAIN

. . . hand-fitting oval shaped grip . . . well balanced for ease of handling . . . practical design for ease of service after long use.

Make your tough jobs easy, your easy jobs a pleasure . . . see your Victor dealer now!

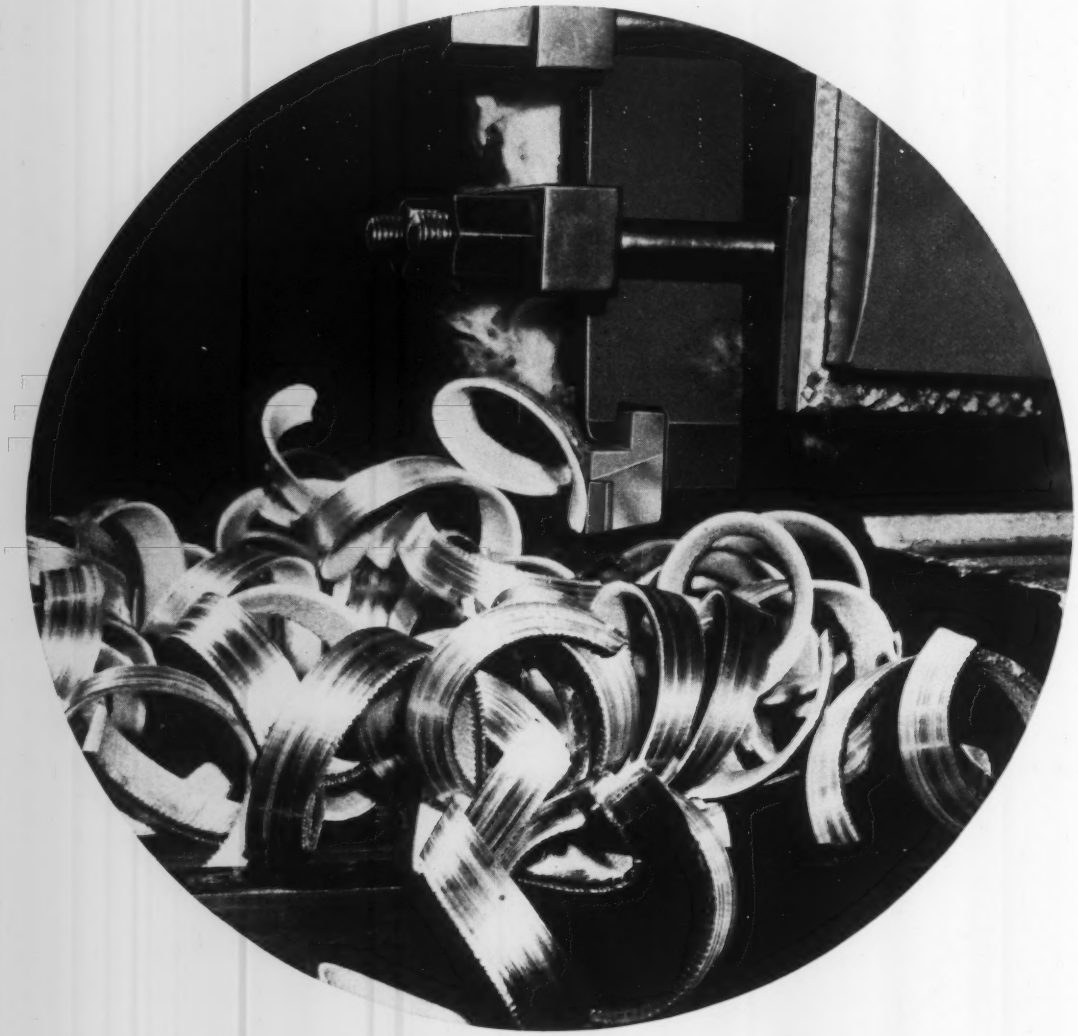
VICTOR

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

844 Folsom St., San Francisco 7 • 3821 Santa Fe Avenue, Los Angeles 58

speeds for carbides **plus** heavy-cut efficiency



low range to 100 fpm . . . for extreme depths of cut and maximum feeds

medium range to 150 fpm . . . for average cuts in medium steel or cast iron

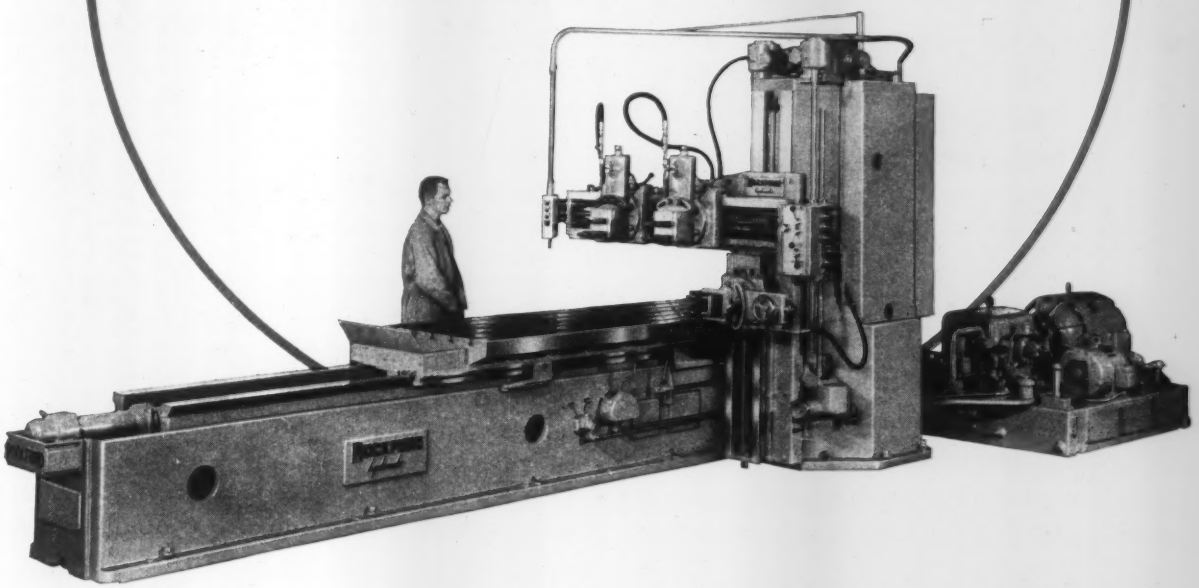
high range to 300 fpm . . . for carbide planing of steel and non-ferrous metals

with triple circuit h3 drive

The new heavy duty Model OGN Hydraulic Shaper-Planers are equipped with triple circuit h3 drive to combine the ruggedness and cutting efficiency of single circuit planers, with the speeds required for carbide planing. Three distinct ranges of cutting speed are provided, with power inversely proportional, to give the correct combination of speed and force to most economically machine any metal.

Hydraulic drive is ideally suited for carbide tooling, since optimum cutting speeds can instantly be set for any tool. Tools also enter the cut more smoothly with hydraulic drive to reduce the tendency for fracturing brittle carbide tips.

A Rockford Machine Tool Co. representative can demonstrate these advantages for you. Ask your local dealer for full details, or write us for a copy of Bulletin No. 1200.

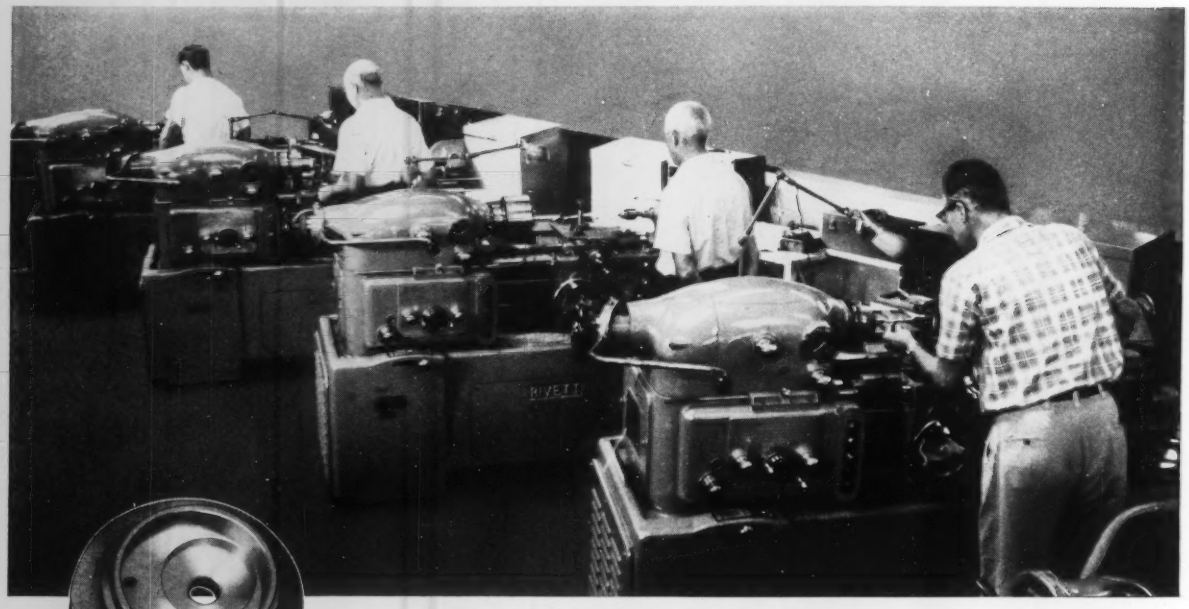


ROCKFORD MACHINE TOOL CO.
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

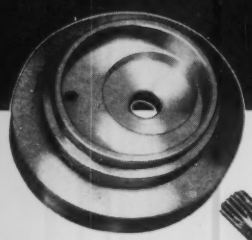
h HYDRAULIC

DAYSTROM
Electric Corp.

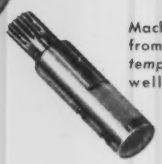
– puts it on a RIVETT!



Battery of Rivett 1020S Lathes in the Research and Development Division of Daystrom Electric Corporation, Poughkeepsie, N. Y.



Brass piece with off-center counterbore and through-hole completely machined on a 1020S Rivett.



Machined on a 1020S from 4140 steel *after tempering* at a Rockwell hardness of C 20-25.

Productivity!

Daystrom machines model parts with an eye to normal manufacturing methods. For this reason Daystrom highlights an important Rivett feature — productivity — in its statement:

"We have found that the Rivett 1020S Lathe is one of the most useful and all around productive machines in our model shop, and is so constructed that it is easy for an average operator to obtain the dimensions and finish necessary in our work."

"Model work requires holding concentricity to .001" T.I.R. between several diameters; turning is often held to several tenths. And, a finish of 32 micro inches and better is quite easily obtained!"

Inquire about the 1020 Toolroom Precision Lathe now. Write for 16-page catalog and the name of your nearest dealer.

RIVETT LATHE & GRINDER, INC.
Dept. ST-6, Brighton 35, Boston, Mass.

RIVETT
"Steelway" Lathes

KOPPERS

announces a new member of its famous family of BITUMASTIC® coatings:

KOPPERS NO.99 INSULATING COATING

for applications requiring both

CORROSION PROTECTION *and* INSULATION!

WHAT KOPPERS NO. 99 IS: Koppers No. 99 Insulating Coating is a black mastic impregnated with cork. It was created especially for use where equipment requires both corrosion protection *and* insulation, and where potential savings in heat loss are not enough to justify expensive block-type insulation.

WHAT KOPPERS NO. 99 DOES: One application of Koppers No. 99 not only protects metal surfaces against corrosion, but at the same time furnishes effective thermal insulation. It also waterproofs, controls condensation, and deadens sound. It is resistant to acids and alkalis, and retains full efficiency through the temperature range from 250F to −40F. It may be applied winter or summer, indoors or out. It dries rapidly, is highly resistant to fire when dry, and may be painted if desired. It can be used on ceilings, partitions, air ducts, tanks, and many other surfaces.

WHY KOPPERS NO. 99 IS EASY TO USE: Koppers No. 99 Insulating Coating requires no surface priming except under unusual conditions. Uniform coatings of the desired thickness may be sprayed on in a single application, using any one of several standard types of heavy-duty spray equipment.

HOW KOPPERS NO. 99 CAN SAVE YOU MONEY: If you have equipment or surfaces requiring both corrosion protection *and* insulation, Koppers No. 99 can save you money two ways. First: it effectively performs *both* functions with only *one* investment in materials and application. And second: because this coating is *long lasting* it *costs less per year* than any other method of providing the same protection. For specifications and applications data, write: Tar Products Division, Koppers Company, Inc., Dept. 101F, Koppers Building, Pittsburgh 19, Pa.

KOPPERS

ONLY KOPPERS PROVIDES

BITUMASTIC

REG. U.S. PAT OFF

COATINGS AND ENAMELS

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

Tuffy® Slings Give Steel Mill Twice the Service of Ordinary Slings

"We are getting twice the service life from our 1¼-inch Tuffy Slings as we did from 6x37 type slings."

This testimonial from a giant steel corporation says more for the quality and dependability of Tuffy Slings than we could tell you in any other way!

The secret of Tuffy's longer life is Tuffy's exclusive, patented, braided construction. This machine-braided fabric combines super strength with extra flexibility.

It's Almost Impossible to Kink a Tuffy Sling. Try It!

Even if you succeed in kinking a Tuffy Sling with the help of a vise, you can straighten it out with no material damage to the fabric. Tuffy's resistance to knotting, kinking and looping is just one reason why Tuffy Slings can give you double the service of ordinary slings. Now let's take a look at the Tuffy ferrule:

Tuffy Pressed-On Ferrule Gives 100% of Fabric Strength

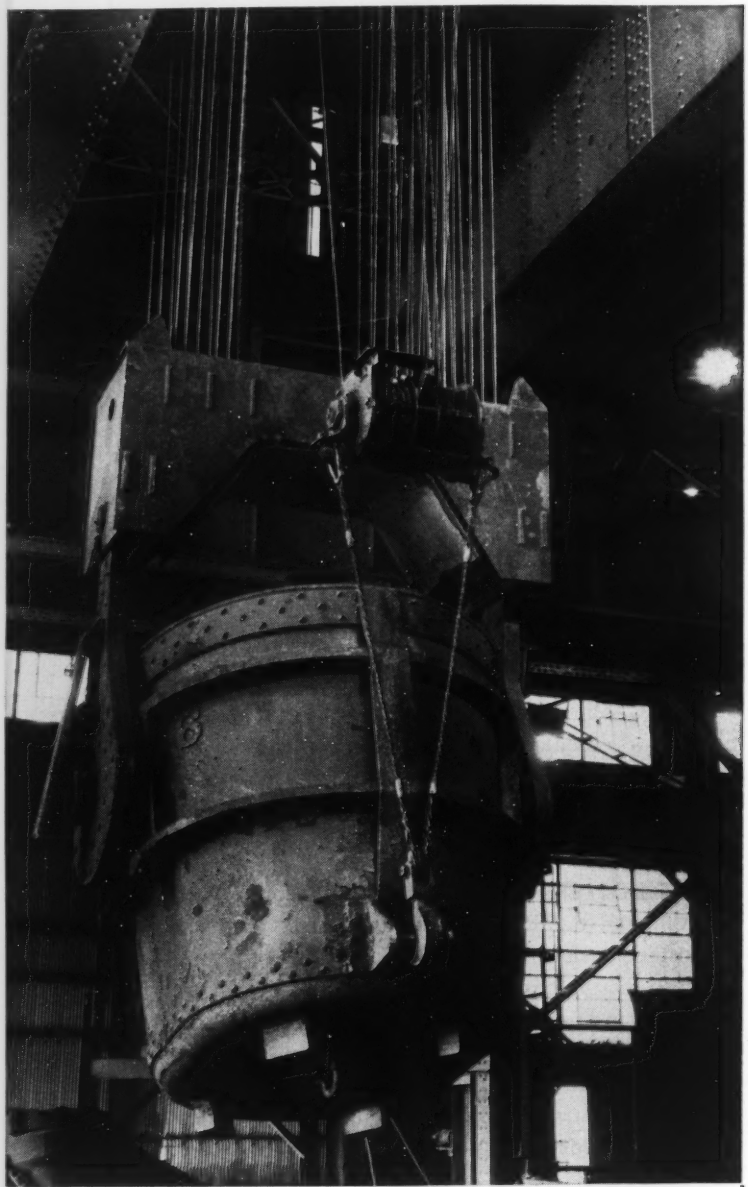
Applied under tremendous pressure, the steel ferrule literally flows into every space between the wires and strands. The friction force created gives the eye splice full strength of the sling fabric.

Your Tuffy Distributor is Stocked to Meet Your Needs

He's ready with your Tuffy Slings and Union Wire Rope needs. Get in touch with him now!

Get Your FREE Tuffy Sling Handbook

Gives full data on Tuffy Sling types, dimensions, weights and rated loads. Plus a complete rigger's manual and engineer's notebook on wire rope constructions and specifications. Write for copy now!



HOT and HEAVY — this huge ladle is "handled with care" by a 1¼" Tuffy Sling and two 1⅛" Tuffy Hoist Lines. The load is 125 tons of molten steel being poured into the furnace.

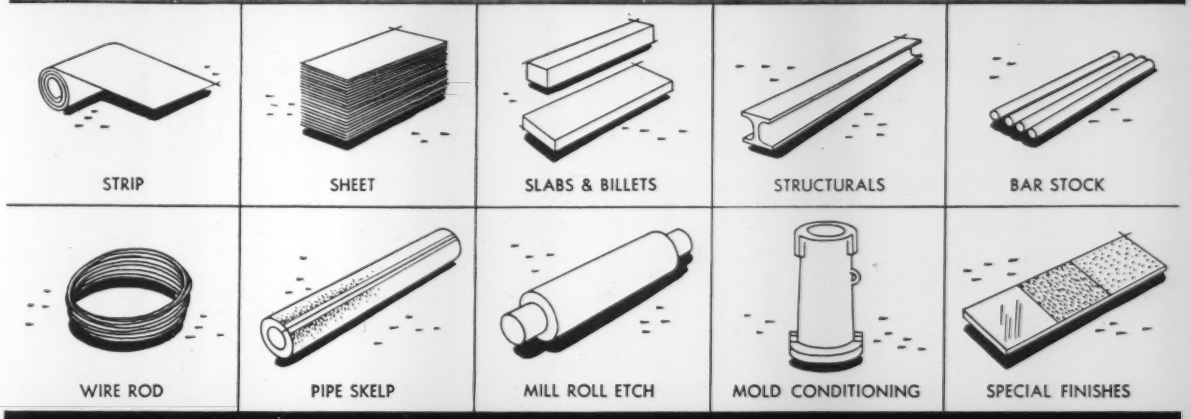
union Wire Rope corp.

Specialists in high-carbon wire, wire rope, braided wire fabric, and stress-relieved wire and strand. (4)

2160 Manchester Avenue **Kansas City 26, Missouri**

WHEELABRATOR®
mechanical descaling

SAVES LABOR, SPACE, MONEY AND METAL WHEREVER IT'S USED ON STEEL!



HOW WHEELABRATOR SAVES

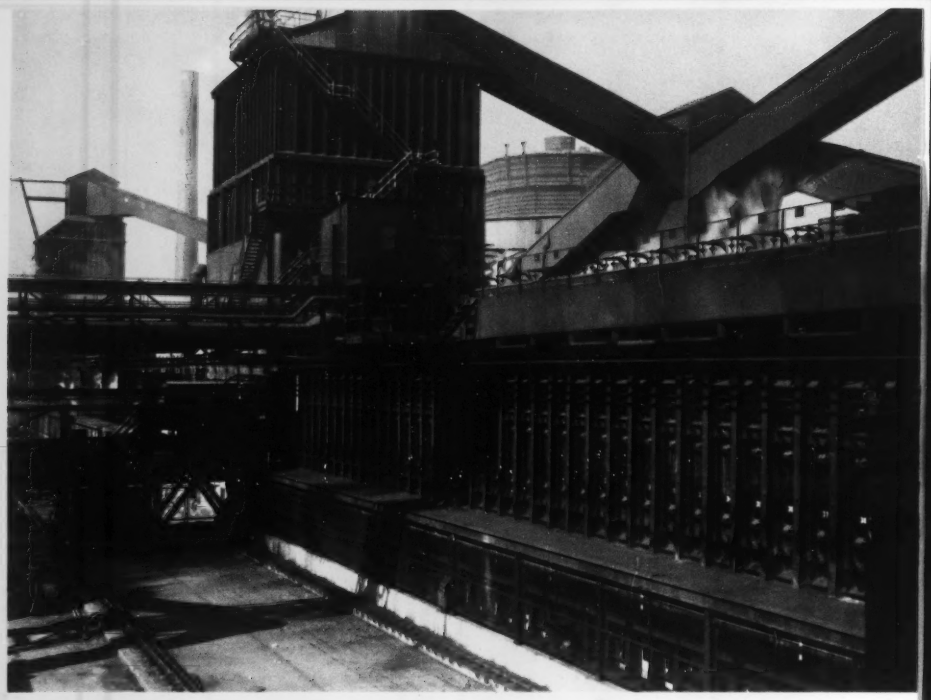
- Replaces or reduces acid pickling
- Saves acid, acid disposal
- Removes only scale – no metal
- Reduces manhour needs
- Requires only 1/3 to 1/2 the floor space
- Gives improved surface for cold working and cold forming
- Reduces need for scale breaking

Wheelabrator mechanical descaling has proved it can remove scale from steel, using little or no acid, and do it faster at less cost than is possible with acid pickling. Over 90 installations have demonstrated this process is cheaper, more efficient and provides a clean material that produces an improved end product. Wheelabrator descaling itself uses no acids or pickle liquors. It removes scale with an abrasive blast from one or more rotating wheels. Each wheel hurls abrasive in a fan-shaped blast pattern against the surface of the material being cleaned. It covers the entire surface (or any portion of it desired) in such a way that it is uniformly blasted to remove scale at a constant rate. This rate can be controlled to suit the requirements of the job.

In many cases, no further cleaning is required and acid pickling is completely eliminated—particularly where the end product does not require cold reduction. This means complete elimination of acid costs, acid disposal problems, virgin metal loss and other inherent disadvantages of acid pickling. Mechanical descaling is adaptable to virtually any speed of production and requires only 1/3 to 1/2 the space needed for acid pickling. The flexibility of mechanical descaling permits its easy integration into lines already in existence and facilitates design and planning of new installations.

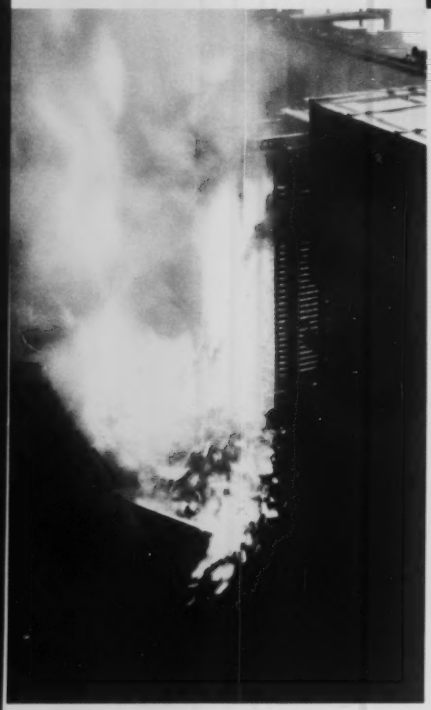
For more information on Wheelabrator for principles and savings, write today for your free copy of Catalog 74-C.

WHEELABRATOR
CORPORATION
509 South Byrkit Street Mishawaka, Indiana



The New One. Battery No. 9, installed by Koppers last year, consists of 41 Koppers-Becker underjet ovens capable of producing 700 tons of furnace coke a day.

Below, ovens are pushed on a fixed 17-hour schedule.



294 KOPPERS COKE

THE NEW NO. 9 COKE BATTERY at Weirton Steel Company went into operation in November, 1956. These 41 Koppers-Becker underjet ovens and five previous batteries, all designed and built by Koppers, give Weirton a total coke-producing capacity of 1,900,000 tons per year.

There are good reasons why Weirton Steel Company, a division of National Steel Corporation, has always called on Koppers for coke plant design and construction. Koppers has been improving coke ovens since 1907—reducing operating costs, increasing the yield of chemicals, improving control of heating. These improvements can be measured in dollars—dollars saved where Koppers ovens are installed.

No Decarbonizing Equipment

Koppers-Becker underjet ovens eliminate the need for decarbonizing equipment because waste gas is recirculated to inhibit carbon formation in flues and in gas ducts. This also cuts fuel gas consumption.

KOPPERS

. . . and another new battery makes

OVENS AT WEIRTON STEEL!

Koppers ovens provide unusually even coke temperature from top to bottom and from door to door. The result is extremely uniform coke.

Plant Layout and Design

Koppers research and engineering staffs can tailor designs and plant layouts to your needs . . . can help you with all problems connected with coal preparation and handling, coal-chemical recovery, light-oil refining and purification, phenol recovery, and other processes associated with coke plant operations.

• • •

Call Koppers for *any* type of steel-mill installation. Engineers from the Coke Plant Department, Freyn Department, and Chemical Department are prepared to work with you during all phases of plant construction, expansion, or rebuilding. Koppers Company, Inc., Coke Plant Department, Pittsburgh 19, Pennsylvania.

Weirton Ovens are 100% Koppers. Every coke oven built for Weirton Steel Company has been built by Koppers. In this photo are batteries 5, 6 and 8 . . . with 147 Koppers ovens in line.

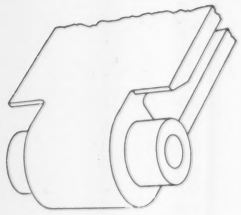
KOPPERS

ENGINEERING AND CONSTRUCTION

TIGHTEN YOUR BELT ON COSTS!

SPECIFY HEAVY-DUTY THERMALLOY* CONVEYOR BELT

Designed by Electro-Alloys to eliminate the "crank-shafting" caused by extreme temperatures and heavy loading conditions. Short integral cast pin allows the link to adjust itself and transfer the load of the belt evenly to the rest of the links. Cast pin is approximately twice as strong in shear as the ordinary wrought alloy bar—and so designed that the bending stress is definitely lower than can be expected from the cast link of a conventional belt.

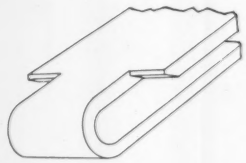


Typical heavy-duty link with cast pin.

FOR LIGHTER PARTS, SPECIFY THERMALLOY GENERAL PURPOSE

A loop-type casting design, suitable for general heat-treat applications in industry. Available in either 3″ or 4″ pitch. The 3″ pitch is a light-duty general-purpose belt, weighing 17 lbs. per sq. ft. The 4″ pitch is primarily designed for intermediate loads of somewhat larger parts, and weighs 21 lbs. per sq. ft.

*Reg. U. S. Pat. Off.



Typical 3″ or 4″ pitch center link of loop-type casting design.

WRITE FOR BULLETIN T-241

. . . giving additional design and application information on both Heavy-Duty and General-Purpose Thermalloy Conveyor Belts. Address: Electro-Alloys Division, 8046 Taylor St., Elyria, Ohio.

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION ELYRIA, OHIO

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"PACKAGED"
METAL-WORKING LINES
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Automated production
From basic metal to finished product
Here's one source responsibility for the design, construction and service of a complete line for the production of almost any metal part or product.
Whatever is required—drilling, machining, forming, welding, etc.—is designed into basic line—conserving space, taking advantage of common drives and integrated feeding and eliminating multiple service responsibility.
You'll want to know more about this sensible approach to modern metal fabrication. Have a Federal-Warco engineer show you one of these packaged lines in actual operation soon.
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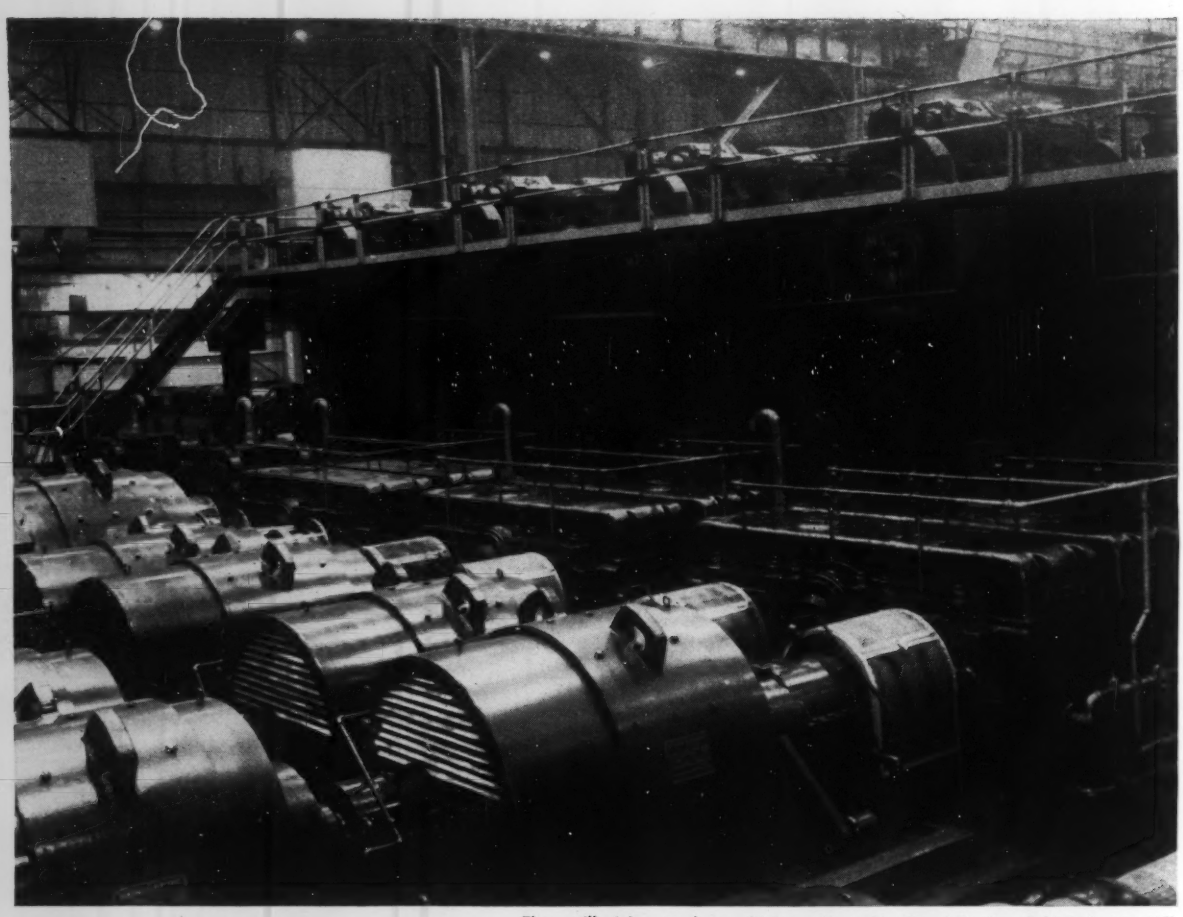


These mill pinion stands are driving a Mesta Five-Stand Tandem Cold Reduction Mill.

Why additives in Texaco Meropa assure adequate "Boundary Lubrication" of heavy duty gears

Special polar additives in *Texaco Meropa Lubricant* are attracted to metal surfaces with a powerful bond. This means that under the great pressures of shock loads, when the fluid oil film is squeezed out from between gear teeth, an adequate "boundary lubrication" film still remains—effective protection against scoring, ridging, or scuffing of metal. And extreme pressure properties in *Texaco Meropa* give it added toughness—help it safely cushion shock or heavy-duty loads.

These are good reasons why *Texaco Meropa Lubricant* helps increase gear life, minimize wear and reduce maintenance costs.

There is a full line of *Texaco Meropa Lubricants* designed to exceed all requirements of main drive units, and other steel mill machinery. A trained Texaco Lubrication Engineer is best qualified to suggest the right one for your operating conditions. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

REG. T.M.

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

STEEL
June 10, 1957

Metalworking Outlook

Delay in Air Force Buying

Look for a one-month delay in Air Force procurement of some aircraft and guided missiles. That's because Defense Secretary Charles Wilson has ordered the armed services to curtail spending by about $500 million in June, the last month in the current fiscal year. In the last two or three months, the Pentagon has been spending at an annual rate of more than $42 billion. Its actual outlay for fiscal 1957 will probably hit $38.5 billion, $2.5 billion above the sum Congress originally allotted (see page 106).

Humphrey Returns to Industry About Aug. 1

National Steel Corp. will name Treasury Secretary George M. Humphrey as chairman in late July or early August. Mr. Humphrey doesn't want his resignation to become effective until Congress adjourns. That appears to be about July 31. . . Even if the legislators work feverishly for the next seven weeks, they'll have a tough time escaping the charge of participating in a "do-nothing" Congress. In the more than five months since it convened, the 85th has one of the slimmest records of accomplishment of any Congress in the last 30 years.

Memo from Washington

Observers feel President Eisenhower's fiscal 1959 budget will stay below the $70 billion level to avoid another budget cutting fight next year and to give the Republicans a chance to recoup for the 1958 congressional elections . . . Business & Defense Services Administration has filled 388 slots of the 600 open in its Executive Reserve for emergency government duty . . . In the six months ended last Dec. 31, civilian government agencies boosted purchases from small businesses to 53.5 per cent of the value of all purchases (valued at $25 or more) . . . A Senate Roads subcommittee wants the 41,000-mile interstate highway system increased by 700 miles and the construction period extended from 13 to 22 years.

Aluminum Use To Climb

The nation's aluminum consumption will double by 1965, predicts Bert Inch, vice president of Kaiser Aluminum & Chemical Corp. He believes the metal's use should rise from 4.1 billion lb (1956) to 8.4 billion in the next eight years. In that period, the electrical industry's needs will rise 140 per cent (see page 268). The nonferrous industry generally will spend $1 billion on expansion and improvements this year.

Bigger Coal Markets Needed

The coal industry needs a 500-million-ton market, C. J. Potter, president of Chester & Pittsburgh Coal Co., told the National Coal Association. We

cannot afford to sit and wait for the market to come to us, he warned. One growing market for the fuel is overseas. Shipments abroad may reach a record 60 million tons this year, if the export rate of the first four months continues. Last year, some 51 million tons were exported, excluding deliveries to Canada. Coalmen are also worried about transportation costs. They predict more coal pipelines such as the one to serve Cleveland Electric Illuminating Co.'s power plant at Eastlake, O. It had its first successful test operation last week.

Utilities To Spend $3.8 Billion

Watch for capital outlays by investor-owned electric utilities to reach a record $3.8 billion this year. Expansion of generating capacity and enlargement of transmission and distribution facilities will meet steadily rising demand.

Thompson Counters a Trend

Thompson Products Inc. seeks to get deeper into the automotive parts business. That's counter to a trend by many auto suppliers who are looking for less competitive markets. Some 30 per cent of Thompson's expected sales of $400 million this year will be auto parts. Its production of power steering pumps and ball-joint suspensions have shown substantial gains in 1957, it reports. And it expects additional auto sales improvements in the next year or two from: Fuel pumps submerged in fuel tanks; fuel injection systems; turbosuperchargers for trucks and, eventually, autos; a hydraulic-pneumatic suspension system; a low-cost compressor for air conditioning systems; a retarder, which is a water braking device designed to enable trucks to slow down on steep hills without burning brakes.

Canada and the Yankee Dollar

Is Canada closing the door on U.S. money? Some observers point to the sale of shares in Algoma Steel Corp. Ltd. to "all-Canadian" interests as an example of "Yankee go home" sentiment. Nonsense. Several U.S. steel firms looked over Algoma carefully, decided the price was too high. Nor did Algoma go to "all-Canadian" interests. English and German principals bought it.

Straws in the Wind

Philco Corp.'s and Radio Corp. of America's 1958 lines of television receivers are both up slightly in price . . . Armour Research Foundation will study the economic potential of low grade iron ore reserves in Brazil . . . Westinghouse Electric Corp. and Carolinas-Virginia Nuclear Power Associates Inc., a group of four utilities, plan to develop an atomic power plant to generate electricity.

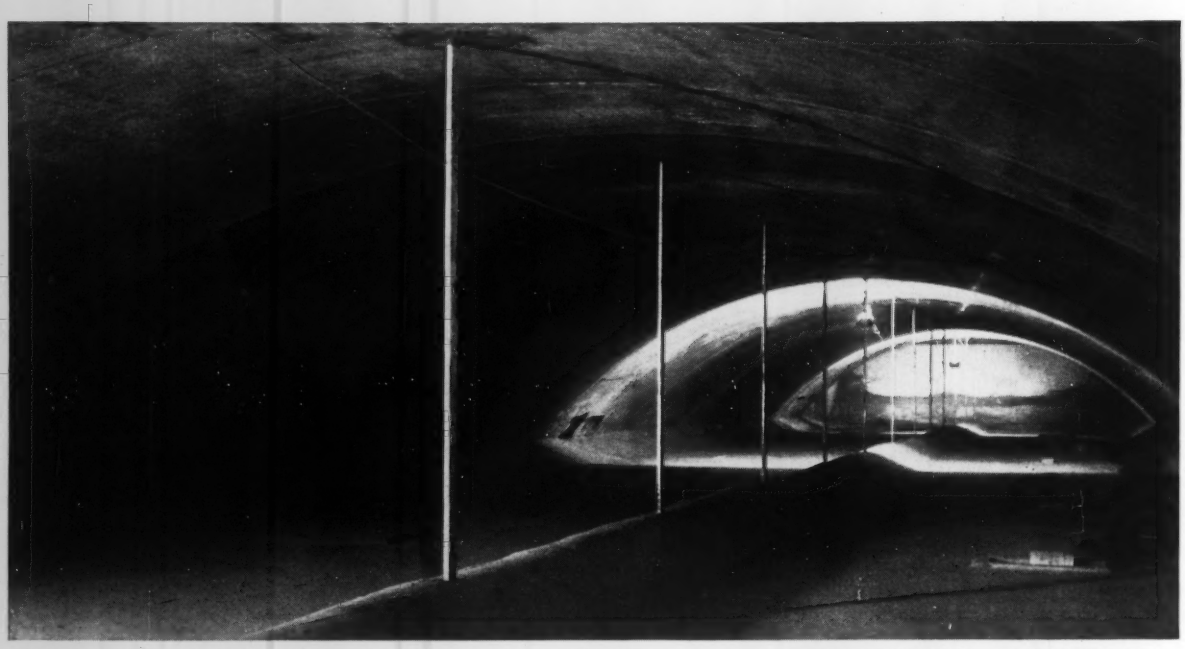
AIN'T THE TAP HOLE IN THE MIDDLE DOOR MARTY?
I'VE HEARD ABOUT THIS, BUT IT'S THE FIRST TIME I EVER SEEN IT!
IT'S GONNA BE A LONG TIME BEFORE THEY LIVE THIS ONE DOWN.
THANKS TO ED GREEN, GENERAL TURN FOREMAN NO. 2 OPEN HEARTH YOUNGSTOWN SHEET & TUBE CO. INDIANA HARBOR, INDIANA
HUEBES

The Red Faces

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO



Drivers below won't see this huge air duct. Its job is to carry away exhaust gases. Strong, corrosion-resistant Armco Stainless Steel bars suspend the "floor" of the duct.

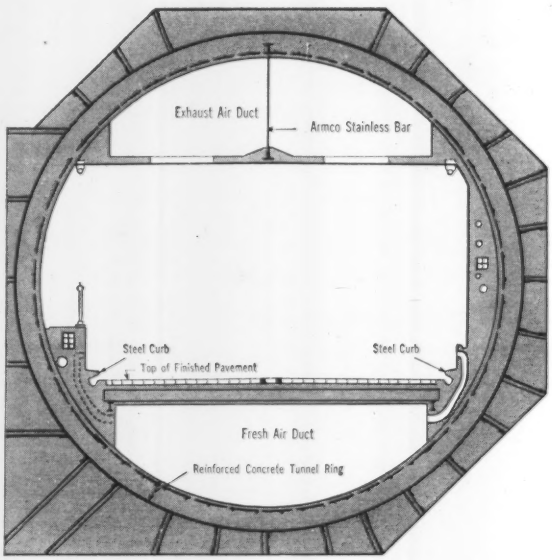
Tunnel Contractor: Merritt-Chapman & Scott Corporation

How Armco Stainless Steel Bars Will Help a Tunnel Breathe

Traffic will soon be routed through the mammoth new twin-tube expressway tunnel now being laid beneath Baltimore Harbor. Motorists who drive through it must have pure air to breathe . . . so the tunnel must breathe too!

Fresh air, inhaled into the "respiratory system" of the giant twin tubes, will enter below the roadways. Dangerous exhaust gases will be exhaled into exhaust air ducts that serve as the tunnel ceilings.

Suspending these ceilings will be Armco Stainless Steel, Type 302 bars. Though relatively thin (¾" x 3½") to cut down resistance to exhaust air flow, they have the strength required to hold up the tons of material that make up the ceilings (the duct floors). But these Armco Stainless bars provide more than strength. They also will resist corrosion from moisture and exhaust gases—assure long service life in a location where minimum maintenance is a *must*.



Here's one tunnel tube in cross-section.

MANY GRADES, FORMS, SIZES

Armco produces a wide range of standard and special stainless steels, in billet, bar, wire, sheet, strip and plate . . . many sizes, shapes and finishes. They serve in an infinite variety of applications.

Complete information about Armco Stainless Steels is readily available.

Just call the Armco Sales Office nearest you, or write us at the address below.

ARMCO STEEL CORPORATION

1627 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

A Dangerous Precedent

In appraising the reaction to the U.S. Supreme Court's momentous ruling last week, STEEL's Washington editor, Jack Botzum, wired:

"The trustbusters are bursting with glee over the decision that Du Pont is acting in restraint of competition by owning 23 per cent of General Motors' stock.

"You may not see the direct results of this decision in Congress this year, but by next year a full-fledged war will be waged between the White House and Capitol Hill to prevent legislation calling for limitation on the size of corporations and the extent of one firm's interest in another."

The Supreme Court, for the first time, finds that the Clayton Act applies to vertical (customers and suppliers) as well as horizontal (competitors) mergers or stock acquisitions. It means that the way is opened for antitrust suits against old as well as newly merged companies and a rash of anticorporate legislation.

An example of the legislation that may be revived or initiated in Congress by eager politicians is H.R. 7. Introduced by Representative Wright Patman of Texas, it would substitute a graduated corporation income tax of 22 to 75 per cent for the present uniform rate of 52 per cent on taxable income above $25,000. Its alleged purpose is to aid small business by shifting more of the tax burden to the big money earners. Its effect would be the gradual breakup of big corporations.

We are making no brief for big corporations. Historically, many of their deeds have been reprehensible. Neither are we making a brief for small business. Size is no measure of behavior.

We would like to make a case for both big and small business. Under our private enterprise system, the big corporations are best equipped for large scale research and development and low cost, mass production. The smaller companies are best equipped to provide component parts, equipment, service and distribution. Only a Du Pont could spend $27 million in developing nylon yarns and plastics which have benefited so many and provided business for several thousand smaller companies.

Working together, large and small business can provide the higher standard of living demanded by Americans. Both need to keep their houses in order under the watchful eye of a benevolent government. But this is no time for a corporation witch hunt.

As an individual and a businessman, why not let your Senator or Representative know how you feel about the upcoming "war" in Washington?

Irwin H. Such

EDITOR-IN-CHIEF

QUALITY CONTROL REPORT

These sparks reveal vital facts about quality control of steel

You are naturally interested in the quality of your finished products—and if you use steel in making them, you should know about the Ryerson quality controls symbolized by this spark test.

Here a skilled Ryerson inspector is checking the carbon content of a steel bar by "reading" the sparks thrown off by an abrasive wheel. It's an amazingly accurate method of making sure that you get exactly the steel you order.

And this is only one of many rigid quality controls that protect you in every purchase of steel from Ryerson stocks. For example, a heat symbol identifies every bar of alloy steel to avoid the problem of variation from heat to heat. Another example: cylinder tubing can be furnished to more accurate inside diameter through Ryerson specs controlling O. D. and I. D. instead of O. D. and wall.

The result: steel of certified quality—assured by exacting Ryerson controls, whether your product calls for carbon, alloy or stainless steels. And these quality controls become *your* quality controls in your finished product.

These are important points to remember when you specify or purchase steel. You get extra value every time you order from your nearby Ryerson plant.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI
CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

In the wake of the Beck affair . . .

1. It has had little influence to date on contract settlements.
2. It has stymied AFL-CIO membership drives.
3. It has made likely stricter federal supervision over pension funds.
4. It has served to unify the AFL-CIO.
5. It hasn't noticeably changed the public's attitude toward labor—*yet.*

Labor: Which Way Now?

STEEL finds that the Beck scandal is exerting a measurable influence on labor matters.

A study of five important areas (see above) reveals it has had a profound influence in three but little or none in the others—yet.

Contract Settlements

STEEL checked employers' associations in Cleveland, Pittsburgh, Detroit and Chicago. They are unable to tie any trends in recent contract settlements to the Beck affair.

Wage boosts fall between 7 and 12 cents per hour. Because no big pattern settlements will be made this year, the spread is unusually wide. Fringe benefits range all over the map, too, because union representatives are doing a lot of experimenting. Samples: Sick leave guarantee per year and catastrophic insurance. A lot of talk goes on in negotiations about the short week, but the contract that provides it is still rare.

Standard fringes are getting the most play—the seventh or eighth paid holiday, more insurance, a better pension deal, longer vacations. Added fringe costs usually run 2 to 5 cents per hour.

The multiyear contract is still popular. (The favorite span is two years.) One reason current settlements are so high: About 550 contracts negotiated in previous years provide automatic increases for some 5 million workers in 1957. Steelworkers, for example, get an average of 9.3 cents per hour on July 1, plus cost-of-living adjustments. Auto workers and farm equipment employees get a 2.5 per cent increase, plus escalation, as a result of contracts negotiated in 1955.

Negotiations are tougher than they were last year because there is no pattern and because of inflation.

Labor Membership

The AFL-CIO is scrapping its $1-million membership campaign as a direct result of the Beck scandal. It's starting all over, on a small scale, with a survey of the South's attitude toward unions.

The decision by engineers and technicians at Minneapolis-Honeywell Regulator Co. to have no union is attributed to the Beck scandal. The Honeywell vote came despite a high-powered campaign by the United Auto Workers. And losses by AFL-CIO affiliates to independent groups are also laid at Mr. Beck's door. Example: The Oil, Chemical & Atomic Workers lost to the Independent Petroleum Workers Union at the Bayway, N. J., plant of Esso Standard Oil Co.

The AFL-CIO had designated white-collar people as the prime target of its $1-million membership drive. Revelations about the Teamsters have stymied that and any plans for headway among southern blue-collar workers. But labor hasn't abandoned its organizing ideas; they're just being shelved a year or so.

Legislative Prospects

Look for legislation to be passed in this session to give the secretary of labor more control over

pension and welfare funds, whether administered by labor, management or both. Also watch for even tougher state legislation to back it up. The Senate Labor & Public Welfare Committee estimates that 75 million employees and their families are dependent in one form or another on welfare and pension plans. Some $7 billion a year goes into the funds, $2 billion of which is contributed by the employees. Probably 500,000 plans are in operation today. They provide life insurance coverage for 29 million workers, retirement benefits for 13 million.

The bill having the best chance of passage is S. 1145, introduced by Sen. Irving M. Ives (Rep., N. Y.), with amendments suggested by Labor Secretary James P. Mitchell. The measure would apply to plans where exemptions or deductions for tax purposes are allowed, or where employees of an interstate commerce company are involved. The legislation would require financial reports and registration of the plans. Information submitted to the Labor department would be available to the public. "Pertinent portions" of the information would be "distributed upon request" to each beneficiary. Mr. Mitchell wants criminal penalties for violation of or noncompliance with the act. He also wants the power to investigate funds not up to the mark.

Eight proposals are before Congress on the right-to-work issue. (Such laws prohibit the union shop.) Four would outlaw the union shop nationally. Four would make state laws illegal and give a big boost to the union shop.

Eighteen states have right-to-work laws: Indiana, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Iowa, Nebraska, North Dakota, South Dakota, Arkansas, Texas, Utah, Nevada and Arizona.

Eighteen states have defeated such legislation: Maine, New Hampshire, Massachusetts, Maryland, Delaware, Pennsylvania, Kentucky, Missouri, Kansas, Oklahoma, Louisiana, Wyoming, Colorado, New Mexico, Idaho, Washington, Oregon and California.

Prospect: No national right-to-work legislation in 1957, but one or two uncommitted farm states may approve it by year end. Sen. John L. McClellan (Dem., Ark.), head of the rackets investigation, and at least four other members of his committee probably will come up with a recommendation for such legislation. It will be backed by all the prestige that will go with the report.

But the final report is a year or so off. Expect more legislative action on other labor matters, too, in 1958.

What Presidents Earn in Unions in

Union	Membership	Locals	President	Annual Salary
Allied Industrial Workers of America (AFL-CIO)	120,000	325	Earl Heaton	$14,999.92
Aluminum Workers International Union (AFL-CIO)	18,900	35	Eddie R. Stahl	9,100.00
United Auto Workers (AFL-CIO)	1,239,000	1,250	Walter P. Reuther	17,999.00*
Brotherhood of Boilermakers (AFL-CIO)	150,000	1,000	William A. Calvin	20,000.00
Communications Workers of America (AFL-CIO)	300,000	17	Joseph A. Beirne	23,950.47
International Electrical Workers (AFL-CIO)	361,639	393	James B. Carey	14,250.00
United Electrical Workers of America (Ind.)	———	——	Albert J. Fitzgerald	7,500.00
Brotherhood of Electrical Workers (AFL-CIO)	630,000	1,697	Gordon M. Freeman	19,541.65
American Federation of Technical Engineers (AFL-CIO)	11,606	72	Russell M. Stephens	9,600.00
International Association of Iron Workers (AFL-CIO)	139,462	313	J. H. Lyons	41,650.08
International Association of Machinists (AFL-CIO)	864,095	1,957	A. J. Hayes	21,493.76
Marine and Shipbuilding Workers (AFL-CIO)	50,000	44	John J. Grogan	15,611.93

*Plus $6362.36 expenses.

Source: Union reports to the staff of the Senate Republican Policy Committee.

Unity in AFL-CIO

The Beck scandal has shaken the AFL-CIO to its foundations, but there's no sign of collapse. Indeed, the blow may prove to be the making of the AFL-CIO marriage which, in the 18 months since vows were pledged, has often proved little more than an uneasy liaison.

President George Meany has acted skillfully and courageously in the crisis, most labor observers agree. His national office has new prestige. He'll use it to tighten controls on the 140 unions in his organization. Expect tighter audits of local funds, closer supervision of local elections, tough enforcement of ethical standards. The traditional autonomy of the old AFL is going to disappear.

Mr. Meany's strategy is to get the Teamsters to reform themselves. He wants to avoid the expense and difficulty of forming a rival truck drivers' organization that would result if the Teamsters were expelled. A good bet: Mr. Beck won't serve out the remainder of his term.

The Public and Labor

The union position on the Beck affair is that Mr. Beck is an example of a human, not a labor failure. A STEEL poll of members

the Metalworking Industry

Union	Membership	Locals	President	Annual Salary
Masters, Mates and Pilots of America (AFL-CIO)	9,500	35	John M. Bishop (sec.-treas.)	14,044.16
Mechanics Educational Society of America (AFL-CIO)	———	——	Matthew Smith (sec.)	15,171.60
Metal Polishers, Buffers, Platers and Helpers (AFL-CIO)	20,000	100	Ray Muehlhoffer	16,076.30
Mine, Mill and Smelter Workers (Ind.)	100,000	170	John Clark	8,941.18
United Mine Workers (Ind.)	———	——	John L. Lewis	50,000.00
Molders and Foundry Workers Union of North America (AFL-CIO)	65,000	423	Chester A. Sample	10,500.00
Oil, Chemical and Atomic Workers (AFL-CIO)	180,000	605	O. A. Knight	20,444.10
Rubber Workers of America (AFL-CIO)	175,000	334	L. S. Buckmaster	16,166.69
Sheet Metal Workers' International Association (AFL-CIO)	50,000	551	Robert Byron	37,523.30
United Steelworkers of America (AFL-CIO)	1,194,000	2,600	David J. McDonald	50,000.00
Brotherhood of Teamsters (AFL-CIO)	1,231,000	970	Dave Beck	59,194.00

of the Senate Labor committee reveals that their mail is predominately in that vein.

Only 10 per cent of Sen. John F. Kennedy's (Dem., Mass.) mail equates Mr. Beck with unionism. Conclusion: Senators have been under heavy pressure to do something about the Beck affair and about conditions that make such situations possible. The pressure to take punitive action against unions in general is slight—but, looking ahead, will antiunion sentiment mount or wane over the next year or so?

Some think it will mount. More sensational disclosures are in prospect at Senate hearings. The comprehensive and final report by the Senate investigating committee will be made about one year from now—when Walter Reuther and his UAW will be negotiating with the auto industry for the short week and other explosive matters. There's no logical connection between the two, but there will be an emotional one.

The two events may arouse public opinion on unionism to a more critical pitch, believe some labor experts.

"That intangible factor could have a tremendous effect on negotiations in 1958, especially on big pattern settlements," comments one observer who negotiates or advises management in some 300 contract settlements a year. "But I've seen little sign of any unfavorable public opinion influencing labor leaders or the membership in 1957. That's because there have been no big pattern settlements and because there hasn't been enough time for this Beck business to sink in."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

Sees New Inflation

U.S. Steel's Tyson puts blame for rising prices on union demands for more pay

INFLATION of a new kind (a spiral caused by increased costs rather than increased prices) was described to the 41st annual meeting of the National Industrial Conference Board in New York by Robert C. Tyson, chairman, finance committee, U.S. Steel Corp.

Declaring that wage demands of labor unions have caused the situation, Mr. Tyson added:

Intangibles—"While there do not seem to be any tangible limits on this power to compel cost-price inflation, there may be some intangible ones. The power is great, and the labor leaders who wield it must have a care to preserve it.

"They are aware that the public, of which union membership forms a part, does not like price inflation. They may feel that strikes are too numerous and too long; that wage increases, causing price increases may provoke public indignation and a challenge to their power."

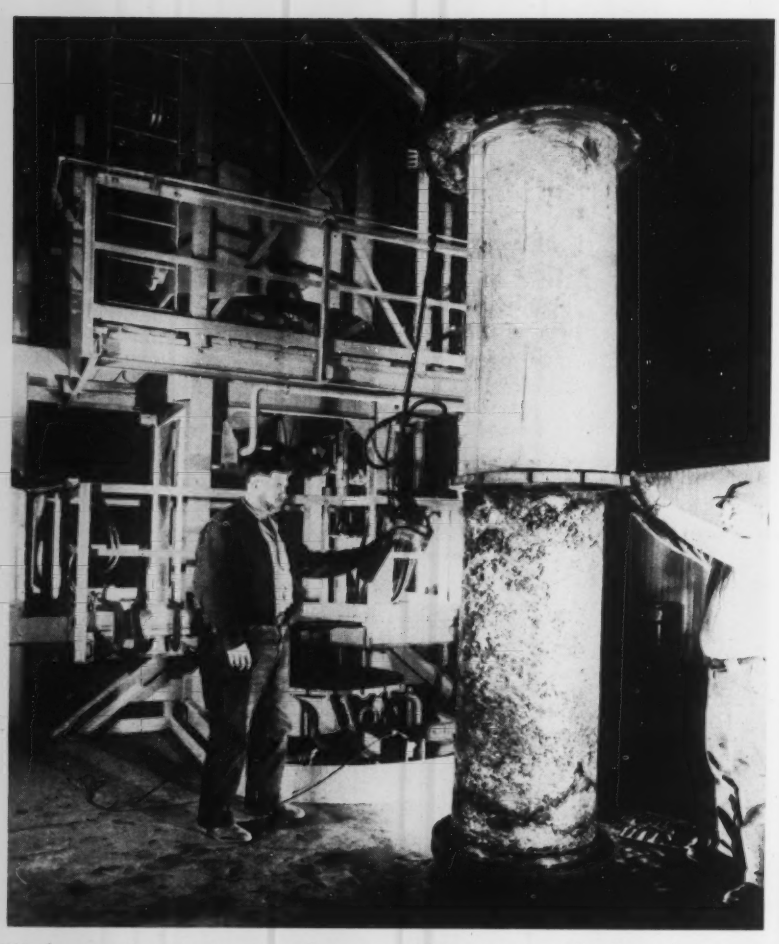
Blame Profits—Mr. Tyson cited union public relation campaigns which blame profits instead of wage increases for rising prices.

"I personally find this a bit curious," he said, "because aggregate corporate profits in 1956, the largest physical volume year in our history, were no greater than they were in 1950. By contrast, the annual compensation of employees has increased over $80 billion, more than 50 per cent, in this same period. The record shows that the period of rising prices has been accompanied by a shrinkage of corporate profit margins."

More Apprentices Deferred

Postponement of military service for apprentices has increased over 14 per cent since October, 1956, says E. E. Goshen, executive director of the Labor department's Apprenticeship Service.

On Mar. 31, 4024 apprentices were in deferred status, compared with 3765 on Oct. 31. Apprentices may be deferred until completion of their training as craftsmen.



Workmen strip a titanium ingot from its mold in a consumable electrode furnace

Furnace Melts Superalloys

A NEW consumable electrode vacuum remelting furnace is now commercially available for melters of titanium, zirconium, high alloy steel and other alloys.

Lectromelt Furnace Co., a Pittsburgh division of McGraw-Edison Co., will manufacture and sell the furnace to companies licensed for this production technique by Allegheny Ludlum Steel Corp. or Titanium Metals Corp. of America. Allegheny and TMCA developed the furnace.

For Jet Use—E. R. Rowley, president, TMCA, jointly owned by Allegheny Ludlum and National Lead Co., New York, reports: "This furnace makes titanium available in quantity to meet exacting demands of jet aircraft, guided missile and other defense industries."

TMCA produces 6000-lb ingots in its consumable electrode furnaces at Henderson, Nev. Allegheny Ludlum uses the furnace to melt a superalloy titanium ingot weighing 5000 lb, but a new furnace will melt 12,000-lb ingots. Superalloys find uses in jet aircraft.

Maximum Purity — Allegheny Ludlum officials point out that even minor amounts of gas impurities and contamination from refractories and electrodes can hamper physical properties and high-temperature performance. Vacuum melting eliminates the dangers. The firm also melts zirconium under vacuum for applications in atomic reactors.

F. H. Plank, executive vice president and general manager of Lectromelt, describes the furnace as a major metallurgical breakthrough. "Now all the refractory metals and many precision superalloys can be production-melted into large homogeneous ingots at great speed and relatively low cost. This melting technique may even be used for common metals by 1965. The operational cost is too great for this use at present."

Cheaper Titanium in Sight

Armour Research Foundation of Illinois Institute of Technology has developed a method of producing titanium tetrachloride of higher purity and at lower cost. Temperatures required are said to be much lower than those of present processes.

It is expected to lead to the use of low grade ores and eventually replace the current high temperature process.

$100 Million in Missiles

The aircraft industry has invested $100 million of its own money in new development and production facilities for ballistic missiles, says Orval R. Cook, president of the Aircraft Industries Association.

Terming it "the highest percentage of profit reinvestment of any major manufacturing industry," Mr. Cook said that in 1956 aircraft companies put 60 per cent of net earnings into expansion. In addition, the 12 largest airframe builders borrowed $275 million, four times the amount borrowed in 1955.

Incentive contracts. Mr. Cook said, hold down costs of new weapons. If a manufacturer produces a new weapon or plane at less than the agreed cost, the difference is divided with the government—Uncle Sam takes 85 per cent. If the agreed cost is not enough, the producer's profit is cut.

Contracts with the military are subject to renegotiation as long as four years after the project is completed.

Standardize Buying

Defense department completes classification of components. Conversion half done

STANDARDIZATION of 3.2 million items in the federal cataloging system of the armed forces has been completed after five years and at a cost of $300 million.

Roger E. Gay, director, cataloging, standardization and inspection, Defense department, told a meeting of the American Standards Association in New York that 14 different major military supply systems were used before the standardization job started.

No Uniformity—These separate systems grew up through the years with little or no uniformity, Mr. Gay said. They had different numbers, classifications and names for similar items.

The change-over to the new standardized system is about half completed, he said. This involves the marking of material and supplies already in warehouses with new identification numbers.

Related—Civilian interest in the new catalog should be high, Mr. Gay said, "because the Defense department buys just about everything anybody buys and uses. Just three items come to mind which U.S. civilian departments buy and Defense does not: Wampum, wigwams and cockroaches."

Mr. Gay continued: "The Defense department has an inventory of about $100 billion. It is conducting the world's largest buying operation.

Base—"The federal catalog system is the base for the standardization program now being carried out with reference to this inventory and this buying."

All commodities are divided into 500 classifications or related groups, Mr. Gay said. Major branches of the service were called on to standardize certain classifications. For example: Electric and electronic equipment were assigned to the Signal Corps; food to the Quartermaster Corps and paint to the Navy.

Compliance—Pointing up the close relation to civilian components, Mr. Gay quoted the Defense department directive:

"In the development of federal military specifications and standards, commercial end items and component parts will be used to the maximum degree practicable. Commercial items will be adopted without modification unless such procedure will not satisfy military requirements.

"Nationally recognized industry and technical society standards and specifications shall be used to the maximum extent practicable in the design and development of material and in the preparation of military and federal standards and specifications."

Turnover—Mr. Gay said the services procure about 600,000 new items each year. Sometimes 300,000 revisions will be necessary in existing items. About 150,000 items have to be dropped from the system each year.

"In each of these cases the federal catalog system must respond immediately with the correct identification data," he said.

Gear Sales High, Net Low

GEAR manufacturers, with dollar volume running high, expect more of the same during the second half.

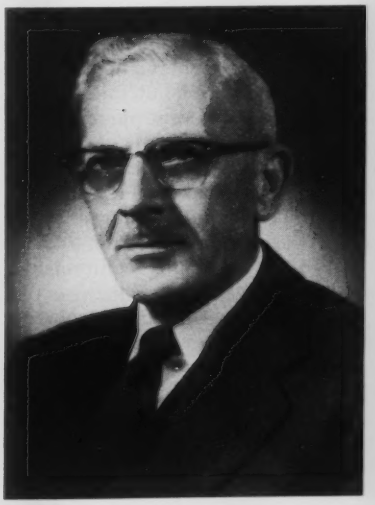
Suppliers to steel mills, the aircraft industry and missile development programs particularly note strength in new orders.

Another Hue—The profit picture is less rosy. Gearmakers have been unable to adjust prices upward to keep pace with inflated costs: That was the consensus of the 250 members attending the 41st annual meeting of the American Gear Manufacturers Association at the Homestead, Hot Springs, Va., June 3-5. Over-all, the industry has a six-month backlog at current rates of shipment.

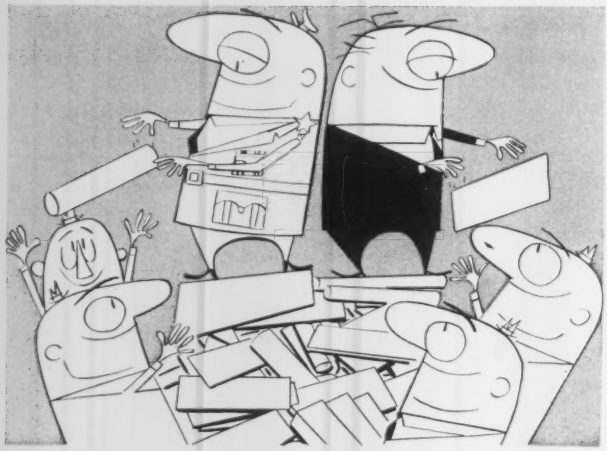
Award—George H. Acker, president, Cleveland Worm & Gear Co., Cleveland, was given the Edward P. Connell award for 1957.

Officers elected: President, LeRoy R. Brooks, president, Tool Steel Gear & Pinion Co.; vice president, E. F. Borisch, executive vice president, Milwaukee Gear Co.; and treasurer, John L. Buehler, president, Indiana Gear Works Inc.

L. R. BROOKS
. . . president, AGMA



GEORGE H. ACKER
. . . receives AGMA's Connell Award



ODM may sell surplus stockpiles as . . .

Hassle on Minerals Looms

DON'T BE surprised if the Office of Defense Mobilization sells off surplus minerals accumulated in the national stockpile.

Review—Defense Mobilizer Gordon Gray says he is "personally giving a lot of thought to a review" of our whole stockpile picture. Under pressure of questioning by the Joint Defense Production Committee of Congress, Mr. Gray admits he "has no wish to influence the market prices" of stockpiled metals. But to soothe congressional tempers, he may be forced to dump quantities of as many as 46 different minerals on the open market.

The General Services Administration, the agency which carries out ODM's stockpile program, says 46 of the 75 strategic items have reached the minimum requirements set up by ODM.

Who's Who—Definitely included among those are: Aluminum pig, beryllium, bismuth, columbium-tantalum, lead, metallurgical manganese, electrolytic manganese, mercury, tungsten and zinc. We have supplies of those metals, says GSA, which meet stringent stockpile specifications for quality as well as quantity. Other goals are being reviewed with the possibility that minimum requirements may be lowered.

There are "ways to economize," points out Mr. Gray, where some of these minerals are "in decided excess of our needs," or the need for them has been "obsoleted" by advancing weapons technology. Any such disposal of stockpiled minerals would be "orderly," Mr. Gray hopes.

Big Four—Four minerals represent 85 per cent of the materials stocked under the Defense Production Act and might be the first to go: Columbium-tantalum, manganese, titanium and tungsten. The DPA program represents only $609 million of our $6.8-billion stockpile. Over $823 million is in the Commodity Credit Corp.'s program run by the Agriculture department, (Surplus farm products are traded for strategic materials.) The rest is bound up with various acts to support domestic producers by building the national and supplemental stockpiles.

The Agriculture department has just announced bartering will be resumed after a 30-day halt to design new regulations which keep the program from interfering with possible cash sales of surplus farm products.

Lead and zinc are heavy items in the barter program, and they are also in excess supply in our stockpile. With Mr. Gray's talk of disposal, some say Agriculture's barter program is due for more drastic reductions or a complete halt.

Criticism—Congressional attention to the stockpile situation last week came through disclosure of Bethlehem Steel Corp.'s offer to GSA to build a Cuban nickel plant through a subsidiary if the government would guarantee the loan. Bethlehem's offer was considered in connection with Freeport Sulphur Co.'s request for fast tax write-offs on a similar facility for the production of nickel (STEEL, Mar. 18, p. 198).

Sen. A. Willis Robertson (Dem., Va.), economy-minded head of the Joint Defense Production committee, charged that ODM should have taken the deal with Bethlehem because: 1. It would have saved the government money. 2. It involved no agreement to purchase cobalt, "which we have stockpiled 140 per cent of our minimum needs."

Conclusion—Asked about International Nickel Co.'s rumored plans to build in Cuba with government tax aid, GSA Administrator Franklin G. Floete says Inco has not been given and will not be given preferential treatment. ODM has made no commitment to Inco, says Mr. Gray.

With the extension of National Lead Co.'s contract to run the government's nickel facility at Nicaro, Cuba, to Dec. 31, Mr. Floete says a decision on the outright sale of the plant will be reached this summer.

Outlook—Many cooks are stirring our minerals brew: Defense, ODM, GSA, Interior, Agriculture and Commerce departments, plus the mining bloc in Congress. Observers think Senator Robertson's committee may be the takeoff point for a solid effort to reorganize the program somewhat along the lines of our farm policies. Price supports could keep the domestic industries going, they say, and also make our stockpiling efforts more realistic. A beginning in this direction: Rep. Lee Metcalf (Dem., Mont.) dropped a bill in the House

hopper last week to help peg lead at 18 cents a pound, zinc at 15 cents. Under the bill, import taxes of 6 cents a pound would be imposed (replacing the existing tariffs) whenever the domestic market price averaged less than the pegged price for one month.

Washington insiders feel the administration missed the chance to clear up the picture when its long awaited minerals policy (STEEL, June 3, p. 58) failed to go any further than offer production bonuses on three minerals and increased import taxes on lead and zinc.

Interior Secretary Fred A. Seaton went to bat before the powerful Senate Interior & Insular Affairs Committee last week in defense of his long range minerals program which has 100 per cent backing by the administration.

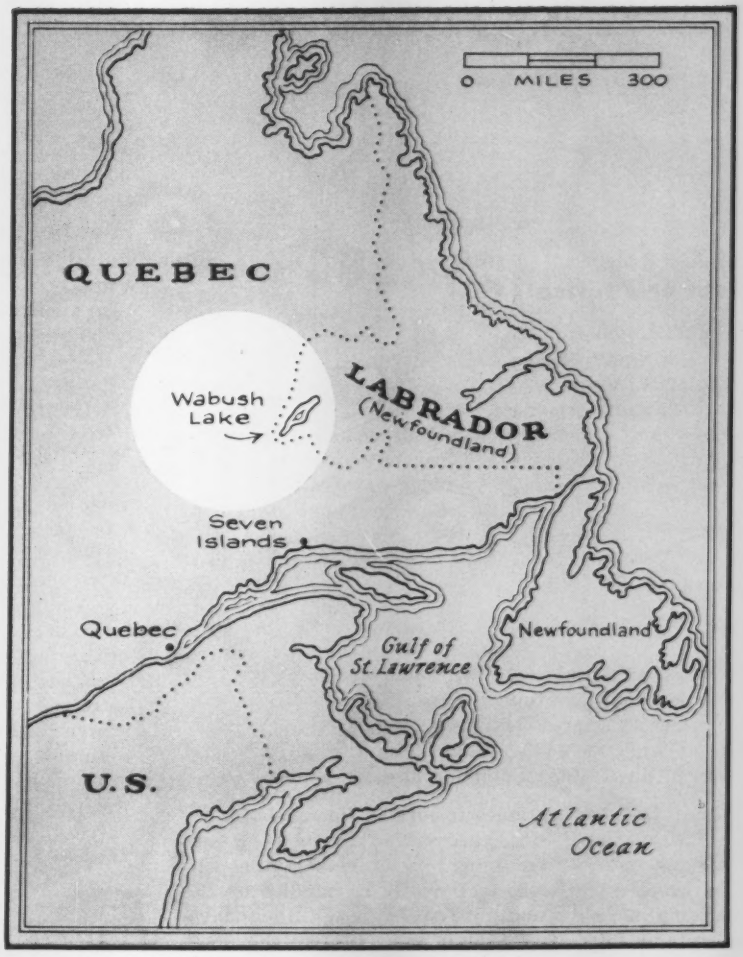
Congressional criticism boils down to a simple charge: The program isn't "long range" at all. Indeed, say stalwart mining interests, it sees no farther than 1958.

Sen. James E. Murray (Dem., Mont.), Interior committee chairman, calls the plan "an insult."

Interior's Defense—First, Mr. Seaton says the program must be reviewed every two years. Second, he presented a metal-by-metal analysis (except lead, zinc, beryl, chromite and columbium-tantalum), adding that present government programs were sufficient for domestic interests.

Mr. Seaton did, however, intimate that the tungsten situation depends upon the House agreeing to go along with the Senate's $30 million program (now stalled in conference sessions between the House and Senate).

Interior spokesmen back the Agriculture department's barter program. The inference: If we could do more bartering, we could get many foreign metals off the open market and boost the price for domestic metals. Assistant Interior Secretary Felix E. Wormser wants more metals put on the barter list, particularly tungsten. Latest agriculture revisions make this seem unlikely possibly because the program may be cut to half its old volume with the new restrictions designed to avoid any cash sales for surplus farm products.



U.S.-Canadian Ore Venture

PRELIMINARY work on production and concentration of low grade ore in the large Wabush lake fields in Newfoundland (Labrador area) (STEEL, Apr. 8, p. 63) is expected to begin soon.

Pickands Mather & Co., Cleveland, has announced the formation of Wabush Iron Co. Ltd. with Steel Co. of Canada, Ltd., Hamilton, Ont., Canadian Javelin Ltd., Montreal, Que., and other unnamed U.S. iron and steel firms.

Legislation — Canadian Javelin had held the area on lease from the province of Newfoundland. Last week the provincial legislature at St. John's approved Wabush Iron's exploitation of the ore field, estimated by the Canadian government to contain over 1 billion tons.

Wabush Iron plans to erect a large processing plant, railroad, docks and auxiliary facilities. Concentration of the low grade ore is believed to be economically feasible.

Ownership—The agreement with Canadian Javelin provides for complete ownership and operation by the Pickands Mather group of the Wabush Lake Railway Co. Ltd. which will also provide transportation for the ore development at Julian lake.

Pickands Mather said the organization of participating American companies is not complete.

SBA's Role: Real or Political?

CAPITOL dopesters figure the Small Business Administration is a cinch to gain permanent agency status before the July 31 deadline, when the agency is due to expire. "Everybody loves small business" is the political fact which assures SBA of its usefulness to the country. Hearings have been concluded in the House and Senate on the subject; few discordant notes were heard in a symphony of praises for the agency.

Loan Level—Wendell Barnes, administrator, proudly tells of the rising number of loan applications received and processed by SBA and intimates the load may level off at around 700 applications per month. A grateful Congress may boost SBA's lending authority as high as $450 million from the current $230 million, plus $125 million for disaster loans.

But this idea continues to lurk in financial circles: Is the agency doing a necessary job, or is it just carrying out the best intentions of Washington politics which could more expediently be handled by the nation's normal financial institutions? In today's climate of increased federal expenditures, the question seems reasonable. Once permanent, SBA will be hard to kill off, even by the most cautious and conservative Congress, and it may be a long, long time before that sort of Congress shows up.

Bankers' View—American Bankers Association claims there is "a serious doubt" of the need for SBA. "Banks and other private institutions have been meeting the credit requirements of small business." This, in spite of continued headlines crying tight money.

ABA bases its views on the number of loans granted by SBA compared with those granted by banks. From Sept. 22, 1953, to Apr. 22, 1957, SBA approved 5896 loans for $278.5 million. In 1955, ABA says its members (97 per cent of the country's banks), had over $6 billion out to over 1 million businesses with assets of less than $250,000.

Competition—The brunt of ABA's arguments falls on the marginal risks status of SBA loans. The agency does not loan money where normal financing is available. So, in the banker's eye, its loans are to marginal operators. ABA suggests well-managed, efficient, small businesses may be up against unfair competition from less efficient firms which might die off except for government loans.

The Hoover Commission backs up ABA: "Where the government lends to fill such a credit gap, it is assisting unsuccessful competitors." Add to that Dun & Bradstreet's study, showing that over half of all business failures are because of incompetence.

Future Test—The test will come, says ABA, when the boom economy slackens off a little. Then some of SBA's chickens may come home to roost—in the form of bad debts.

No Help Wanted Here

Office of Defense Mobilization, very alert to government giveaways (or charges thereof), read of the rumored move to finance new freight cars with aid from the government (guarantee loans, tax write-offs or what-have-you), and promptly called in Washington representatives of individual railroads and the American Association of Railroads. "No such thought has entered our minds," they answer. Likewise to inquiries from Commerce department and Interstate Commerce Commission. The railroads, currently after a freight rate increase, want no part of another Idaho Power (Hell's Canyon) story, and plan to peddle their proposal quietly until things cool down a little. The rumors arose because the Pennsylvania, New York Central and Baltimore & Ohio are considering formation of a separate financing organization to buy freight cars.

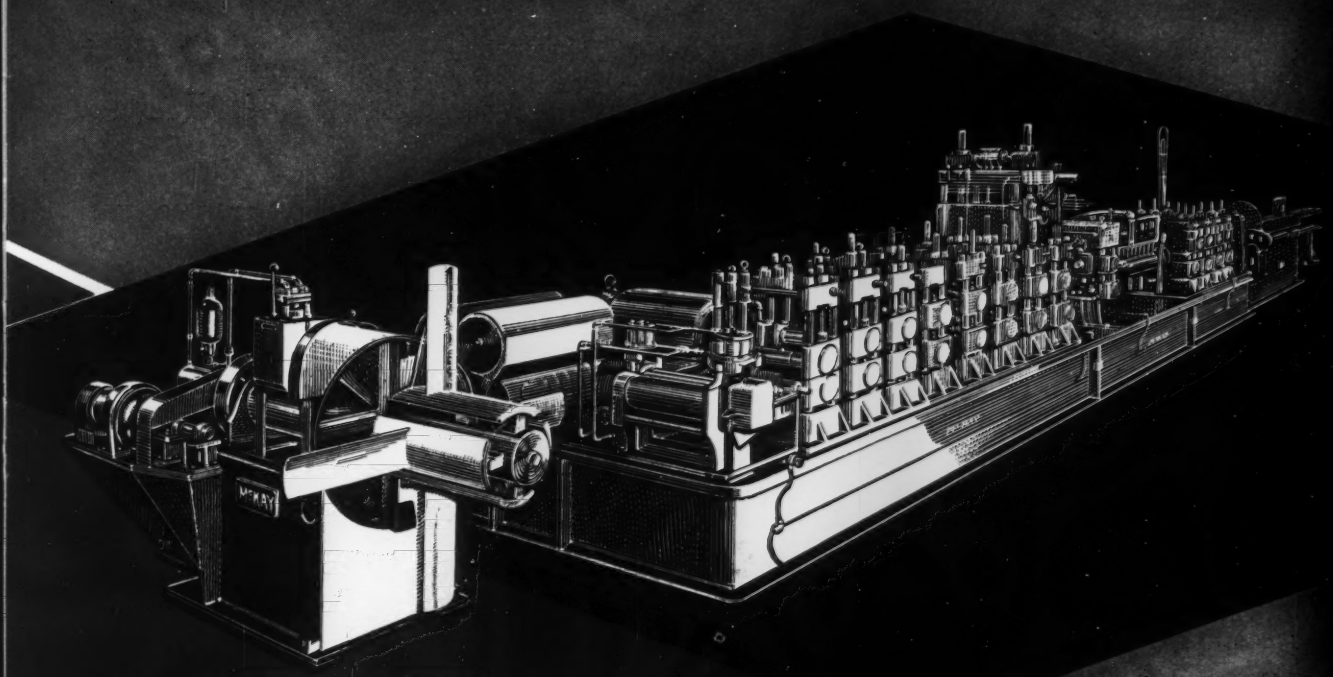
Defense Faces Budget Cut

Defense has been ordered to hold spending in fiscal 1958 to $38 billion, following notice from Treasury that the Pentagon went over its fiscal 1957 spending program of $36 billion by $2.5 billion.

Defense Secretary Charles Wilson also notified the services to cut procurement activities on the installment plan. It particularly affects the Air Force. Components of a plane or missile are contracted for over a period of years, but the money isn't budgeted until delivery.

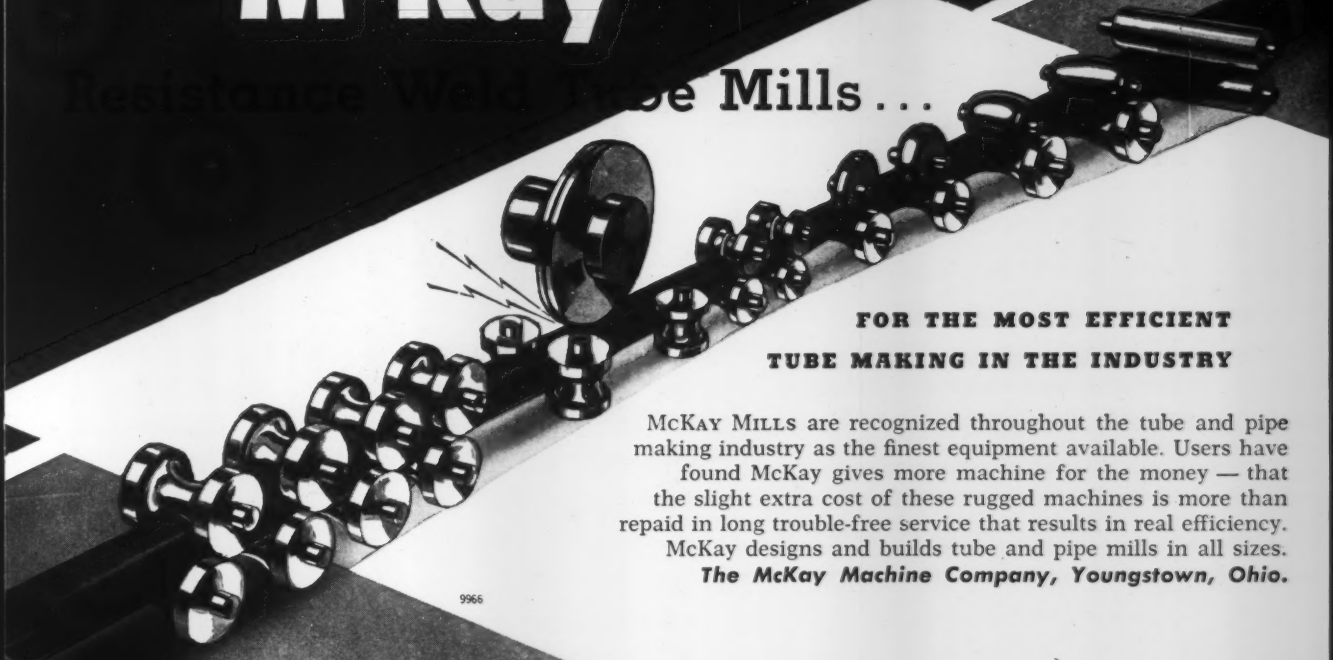
Airpower Minded—Sen. Stuart Symington (Dem., Mo.), leader of the airpower group on the hill, says we are endangering our defense system with such economy moves, and he is getting backing from plenty of other congressmen. AF schedules amounting to $3.5 billion will be delayed by Mr. Wilson's ruling, says an AF spokesman.

Congress finds itself in the middle of this one because the House has put through a cut of $2.5 billion in Defense's fiscal 1958 appropriation. Now, the legislators are finding out what such cuts can mean to the defense system (or at least what defense officials want them to think). Look for much oratory before the matter simmers down to a compromise on the House cut. This action by Defense should forestall Senate budget cutters.



McKay

Resistance Weld[illegible]be Mills . . .



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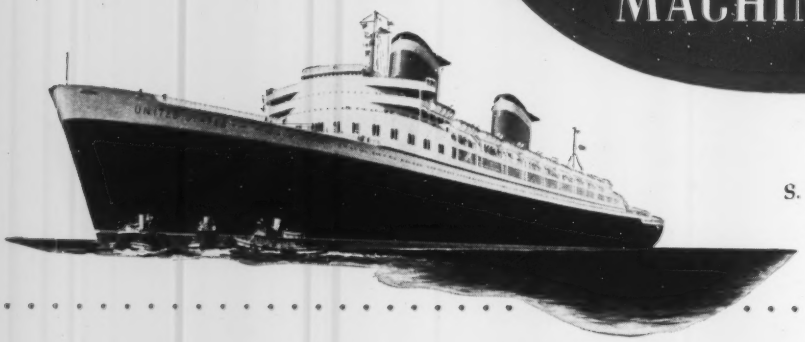
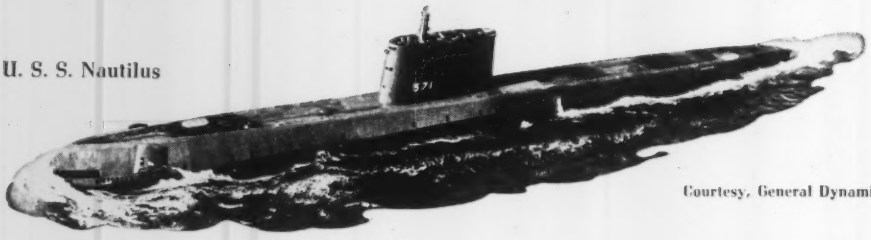


S. S. United States

U. S. S. Nautilus



Courtesy, General Dynamics Corporation

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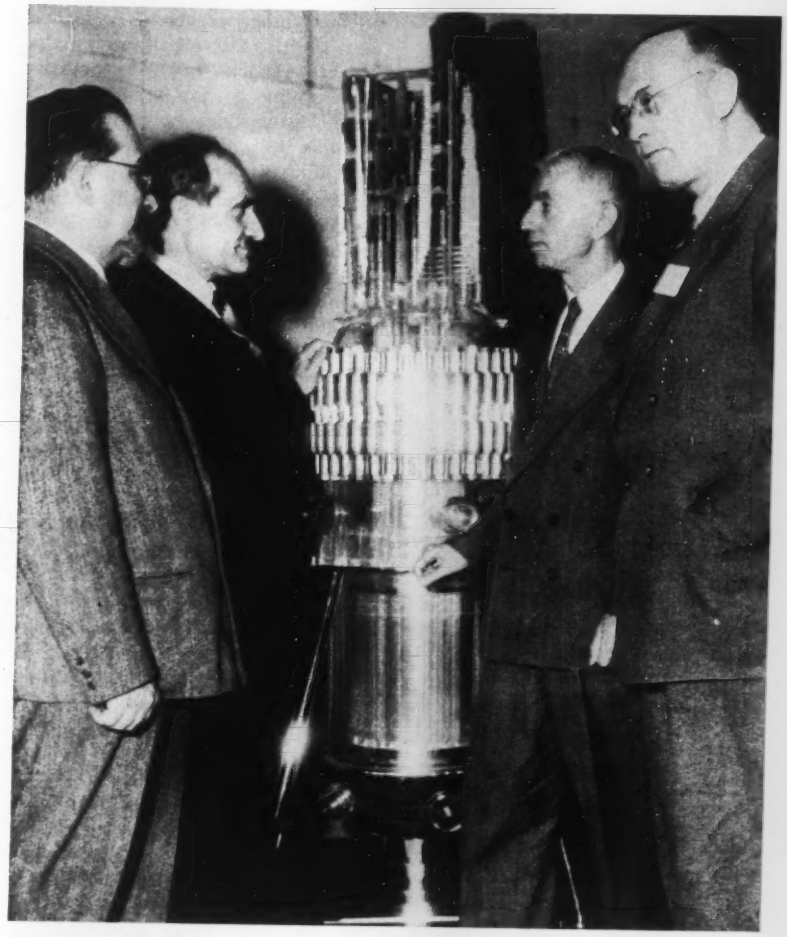


Euratom's "three wise men" on recent U.S. visit. (Left to right) Francesco Giordani (Italy), Louis Armand (France), Rear Adm. H. G. Rickover (USN) and Franz Etzel (Germany)

Euratomic Power Goal Up

Six nations urged to develop atomic electric power for all industry to reduce dependence on Middle East oil via Suez canal. U.S. is expected to supply material

THE SUEZ CANAL crisis has raised the nuclear power goal of the six Euratom nations (STEEL, Apr. 8, p. 69).

A capacity of 15 million kw by 1967 is proposed.

Acceptance of this move to reduce the precarious reliance of Euratom (France, Germany, Italy, the Netherlands, Belgium and Luxembourg) on Middle East oil is certain. It was recommended in a report by the group's "three wise men": Louis Armand, Franz Etzel and Francesco Giordani.

Political Caprice—The report explains that only from the Middle East can Europe's energy demands be supplied with conventional fuel (oil). "The Suez crisis has given us warning of what this could mean," it says. "As the quantity of oil imported from the Middle East increases, there will be a corresponding increase in the political temptation to interfere with this flow, which could be an economic calamity for Europe."

Atomic power offers the only sure protection against such a possibility, says the report.

The proposed goal is termed "ambitious" but well within the area's industrial capacity. It is more than twice the combined total (6 million kw) presently planned by all six countries. Great Britain is aiming at a capacity of 6 million kw by 1967, but the report points out that population of the Euratom group is three times that of the UK and its present electrical output 2.8 times larger.

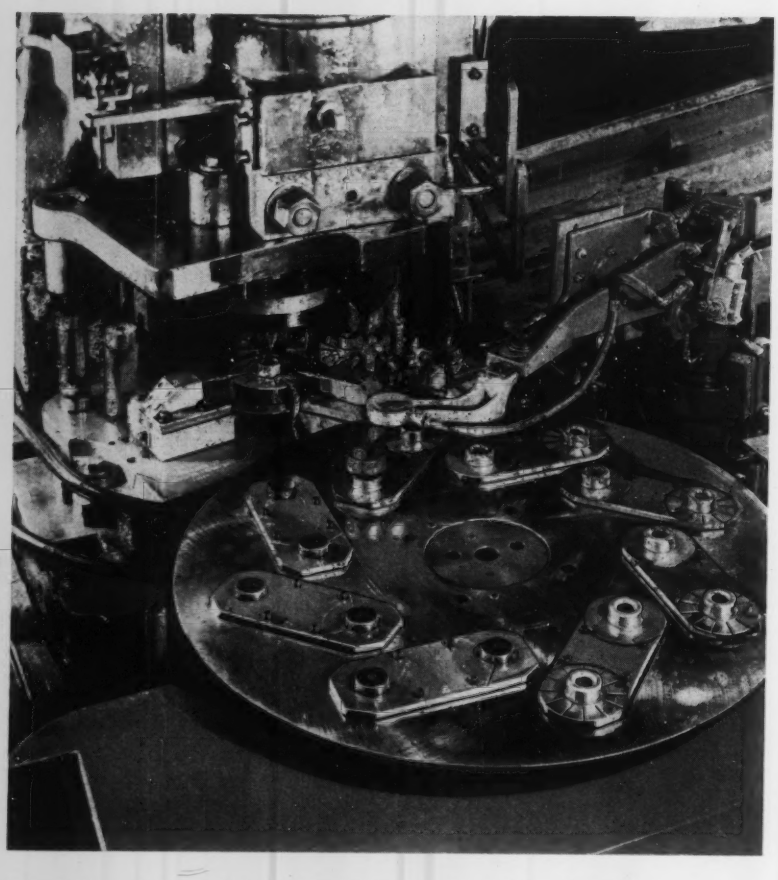
Greater Need—The Euratom community imports 25 per cent of its energy needs, more than twice the figure for Great Britain. (Energy needs are measured in terms of coal but supplied mainly by oil.) The proposed nuclear power goal would stabilize West Europe's energy imports by 1963 at 165 million tons of coal, equivalent to $3.3 billion worth of oil.

Otherwise, says the report, the current cost of $2 billion a year would rise to $4 billion by 1967 and $6 billion by 1975.

Two-Way Street—The report states that the U.S. has agreed to supply nuclear reactors as well as nuclear fuel and technical information in return for "practical knowledge gained by the large scale industrial application of nuclear power."

It is pointed out that high installation costs of nuclear reactors will be offset by the low operating costs. In the U.S., a kilowatt is produced for 0.5 to 0.75 cent, using conventional fuel. It is believed that atomic power can be made by Euratom for about 1.1 cents per kilowatt.

Savings—While the $6 billion outlay required (three times the cost of conventional power stations of the same capacity) "will create some difficult problems for our national economies," the report says, big foreign currency savings will result from reduced imports of oil and coal after the first few years.



Detroit Stamping Co. has modified automated machines like this

Job Stampers' Trends Up

VARIED, but slightly up, is the job shop stamping picture as the second quarter enters its last month. Prospects are bright for some increase during the last half.

Some operators report volumes 10 to 16 per cent under the 1956 pace (the best year in the industry's history). Others are 7 to 20 per cent above that mark. But over-all production is close to or slightly above last year.

Sees Rise—The index of the Pressed Metals Institute shows that the industry's orders are averaging 5 per cent higher than they did last year. "It (the index) will probably be up 10 to 15 per cent by the end of the year," says H. A. Daschner, PMI secretary.

Captives — The captive plant situation (stamping shops operated as part of a firm whose chief business is an end product) is a big issue, though opinions vary. You don't hear much about them in New England and the East generally because there is little captive competition in the area. Even in the Middle West, where many automotive and other captive plants operate, reactions vary. Mr. Daschner takes this view: "They complement each other. As the captives grow, so does the whole industry."

More Subcontracts — A spokesman for the Detroit Stamping Co., Detroit, reports "more automotive work going to job shops due to Ford Motor Co.'s new Edsel and last minute model changes by General Motors Corp."

"We have no competition from captive plants, and we do some automotive work," says Clarence Custer, president, American Stamping Co., Euclid, O.

Other Side — Carl B. Parsons, president, Parsons Corp., Detroit, says: "The trend toward captive plants in the automotive industry is growing." Parsons Corp. currently is running 20 per cent ahead of last year "due to more aggressive selling," reports Mr. Parsons, who adds that despite this increase, his sales were below 1950's "due to the increase in captive plants."

"You are bound to lose business when things tighten up," says C. C. Caditz, president, Northern Metal Products Co., Chicago. "What we have to do is to show these people (captive operators) that we know more about stampings, have better facilities and can do the work echoes that view.

Warren Peterson, president, Peterson Products Co., Chicago, echoed that view.

Shift—Says Edward F. Carney, vice president, Geometric Stamping Co., Euclid, O.:

"Currently, captives are taking more and more of the stamping business, but I believe this trend is about over. Companies are beginning to realize that many products do not lend themselves to automation. We can do many jobs cheaper than they can be done in a captive plant, and as the newness wears off automation, I am sure more business will come to the job shops."

Carter C. Higgins, president and general manager, Worcester Pressed Steel Co., Worcester, Mass., reported the results of a survey showing that customers accounting for 62 per cent of the stamping market had been making their own components up to last year (STEEL, Feb. 18, p. 112).

Reversal—"However, looking to the future," Mr. Higgins continues, "81 per cent expected to buy the same share, or more, indicating a sharp reversal of a trend that be-

came marked at the end of the Korean War."

Another survey (STEEL, June 3, p. 65) shows that more than half the automotive parts used in Detroit (including items other than stampings) are subcontracted. GM farms out 51 per cent of its parts; Ford, 59 per cent; Chrysler, 65 per cent; the Independents, 70 per cent.

Production—Most stampings are made of steel, including stainless. Job shops produce twice as many pieces as captives, according to Mr. Daschner, but captives have the edge on tonnage because they make heavier parts.

Among captives, automotive plants turn out the biggest parts and the most tonnage, but other industries have more captive plants.

Household appliances, business machines, TV and radio, heating, ventilating and air conditioning, electronics and just about every industry making anything from metal sheets has some captive production.

No Unanimity—The importance of the auto industry is subject to a difference of opinion.

"The automotive market is lessening in importance," believes J. H. Parmenter, vice president, New England Pressed Steel Co., Natick, Mass.

"Let's face it," says Mr. Carney. "The automotive market is the bellwether of the entire metalworking suppliers industry. But I believe in the future of the job shop stamper. It was the fabrication of cold steel, as developed in the job shop, that loosened the bottleneck and increased the use and consumption of steel to bring about our present high standard of living."

Expansion—Mr. Carney's belief in the future is backed up by a PMI survey of independent shops. It reveals that 40 per cent have increased their plant capacity in the last year.

Another 44 per cent, the survey shows, plan to expand their plants or modernize and improve their equipment within the next two years. The same survey reveals that 56 per cent expect to be better than 1956; 34 per cent think it will be as good; 10 per cent see less business.

Computer Aids Production

Information on product flow reaches Cross Co. management in time to be used in manufacturing control. Original estimate of $50,000 a year savings will be conservative

ELECTRONIC computers can pay for their keep in small and medium-sized companies.

Payoff—With 550 employees and a $15-million sales capacity, Cross Co., Detroit, put a Remington-Rand Univac 60 to work in its new special machine tool plant. (STEEL, May 6, p. 84)

Management figured it could save about $50,000 a year with the machine. (It costs about $1000 a month to lease.) Although the installation has been in less than six months, Ralph Cross, executive vice president, thinks the estimate looks conservative now.

Why? — President Milton O. Cross explains that the computer was hired to help tighten the reins on manufacturing operations and to show a current picture of workpiece flow through the shop. (H. M. Shilson, comptroller, says it couldn't be justified on accounting savings alone.)

The machine is used to help calculate machine loadings, manufacturing costs, progress reports on orders and the company payroll.

Shop Control—As soon as a project gets the engineering release, it's scheduled through the plant by machine center and by the week. Machine loadings are rechecked every week. With information that current, the manufacturing department can anticipate bottlenecks.

The computer also helps to calculate orders that are 25, 50 and 75 per cent completed. These reports, coupled with the regular machine loading studies, give the manufacturing manager a continuous picture of work progress. He not only can keep machine centers loaded properly, but he can keep them loaded with the right parts.

Cost Data—Cross also is using the computer to figure what it costs to produce an order. Data are available for such things as machining, assembly, raw material and purchased parts.

In the Works—Although the machine already is paying its own way, Cross executives will use it on other projects. Here are some they have in mind: Screen inventories to match needs against supply, calculate design problems such as complex gear trains, keep track of unclosed business to help predict sales, analyze lost business to see why it was lost.

Mr. Shilson warns that you can't start by putting your present accounting system through the computer. It must be tailored to it.

Cross' computer is integrated with other tabulating and sorting machines

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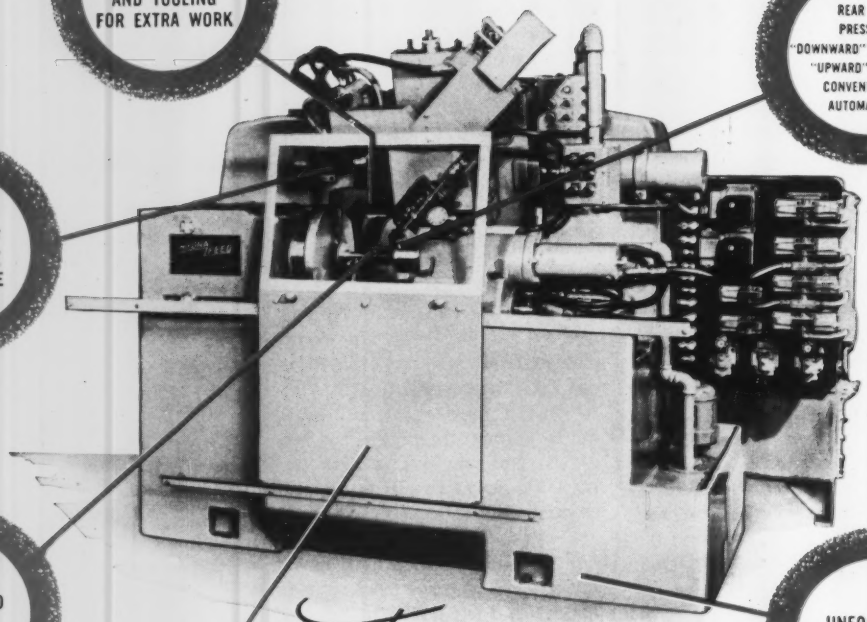

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Tooling Deadlines on Time

Slow year in automotive tool and die shops brings out the usual gripes and rumors. Availability of materials means that there will be no holdup on new models

NEW MODEL TOOLING will be finished in time to meet July and August deadlines, report automotive tool and die makers.

This means car builders can meet introduction dates which are within a week or two of last year's schedules. Experience has shown the industry that it's difficult to bring out new cars before late September or October.

Early Birds—Edsel is the only car primed to meet a mid-September opening, but the company has had almost an extra year to get it ready. Chevrolet and Lincoln also are trying to make it by the end of that month.

Latest reports have it that Chevy, at least, will be lucky to hold its opening more than a week ahead of last year's Oct. 19 date.

Who Cares—What happens to 1958 models after August doesn't greatly concern tooling people. They're more interested in learning when the '59 tooling programs will break. Heavy die work already is out since it takes almost a year to complete.

So far, Ford is the only firm which has committed itself for August tooling contracts, but rumor has it that Chrysler is ready to start the same month or in September.

Shops around town say the 1959 Ford program looks fairly large. The company is buying 3500 dies for its '59 cars, reports one diemaking shop.

Slow Year—Despite this hopeful outlook, 1957 shapes up as a slow year for Detroit tooling firms even though the industry as a whole will equal last year's shipments of $1 billion plus. Few changes for '58 cars are keeping the profits of these shops down.

Chester A. Cahn, managing director, Automotive Tool & Die Manufacturers Association, Detroit, says: "We believe this area's business will be as good as it was in '55. It will not equal that of 1956, which was the record year to date."

Last month a few shops moved up to a normal 58-hour week to meet final deadlines, says Mr. Cahn. Most of the smaller tool and die makers still are working only 40 and 48 hours.

Three Classes—Rounding out the picture, there are perhaps 18 or 20 big tool and die companies which employ 200 to 300. They get major body die contracts and usually can keep a full shop.

Another 250 or more outfits employ 50 to 100. They find the going tougher and concentrate on quality and intricate tooling work.

Dog Fight—Alley shops employing 2 to 12 make up the third group. It's tough to say how many there are—estimates range from 700 to 1800.

Pay — Detroit tool and die workers have a long standing rep-

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Studebaker's Scotsman Makes Bid for Economy Field

This three-model series has 116.5-in. wheelbase and 101-hp engine, with 7.8:1 compression ratio. It's designed to average 29 mpg. Prices, excluding shipping charges and state taxes, are $1776, $1826 and $1995

utation for collecting the highest wages in the industry.

The average this year is about $3.50 an hour, plus 58 cents or so for fringe benefits. Another 8 to 10 cents has just been tacked on to cover the annual improvement factor. Specialized diemakers draw $3.85 or more an hour as base pay.

Comparisons — The estimated average hourly wage in Cincinnati is $2.90 to $3, $3.40 in Philadelphia.

Even discounting a higher overhead for less experienced men and adding on shipping charges, it's still cheaper for an auto company to buy tooling in Cincinnati or Dayton, O., for example, and have it trucked up to Detroit.

Prepare—This trend will continue as auto makers locate more plants in other states. Mr. Cahn points out less than a third of the tooling in Detroit is nonautomotive. He indicates tooling people may have to look for diversified markets.

Two items (progressive dies and missile tooling) are stronger than usual this year. They could make for more stabilized tooling which, in turn, would tend to lower wage rates.

Dies — Progressive dies grow larger and more complicated as automation gains momentum. This year, 120-in. progressive dies are common. Some 170-in. units are being built.

Car companies are ordering more progressive dies. It means longer lead time will be needed to handle the complicated jobs.

Missiles — Another tentative trend is the pickup in missile tooling. Jeffery Die & Engineering Inc., Detroit, says its aircraft work has fallen off somewhat, but missile contracts have increased. Other shops report the same.

Contract Spurs Fight

The Army awarded a $190-million tank production contract to Chrysler Corp., but most of the work will be done in Newark, Del., instead of Detroit.

Wilber M. Brucker, secretary of the Army, says higher freight and tax costs made the difference in where the work would be done. The Army stood to pay an extra $1.8 million if the contract had been let in Michigan.

The matter won't be quickly forgotten because Michigan's Democrat governor, G. Mennen Williams, had gone to Secretary Brucker to plead that the contract be completed in his state.

Loss of this contract will add more flame to the sputtering fuse which stands ready to touch off an industrial explosion in Michigan.

Industry agrees on these facts:

- A labor dominated legislature has built up industrial and corporate tax rates to top-heavy levels (STEEL, May 13, p. 69).
- Wage rates for hourly employees have risen almost 12 per cent above those of other industrial areas according to UAW sources.
- Detroit has long depended on the automobile industry to keep it solvent, but car builders are locating new plants closer to market sources and in states with lower tax rates.

Kaiser Aids Missile Tests

A $1.7-million contract to produce guided missile test equipment has been awarded to the Toledo Electronics Division, Kaiser Aircraft & Electronics Corp., Toledo.

Lowell M. Shuck, division manager, says the equipment will be used by Air Force technicians to make automatic ground checks on performance of missiles in flight.

U.S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,617
May	534,000	471,617
5 Mo. Total	2,875,252†	2,762,168
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
May 4	119,999	112,705
May 11	125,924	105,552
May 18	127,390	105,763
May 25	127,428	108,126
June 1	82,502†	77,433
June 8	125,500*	105,074

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

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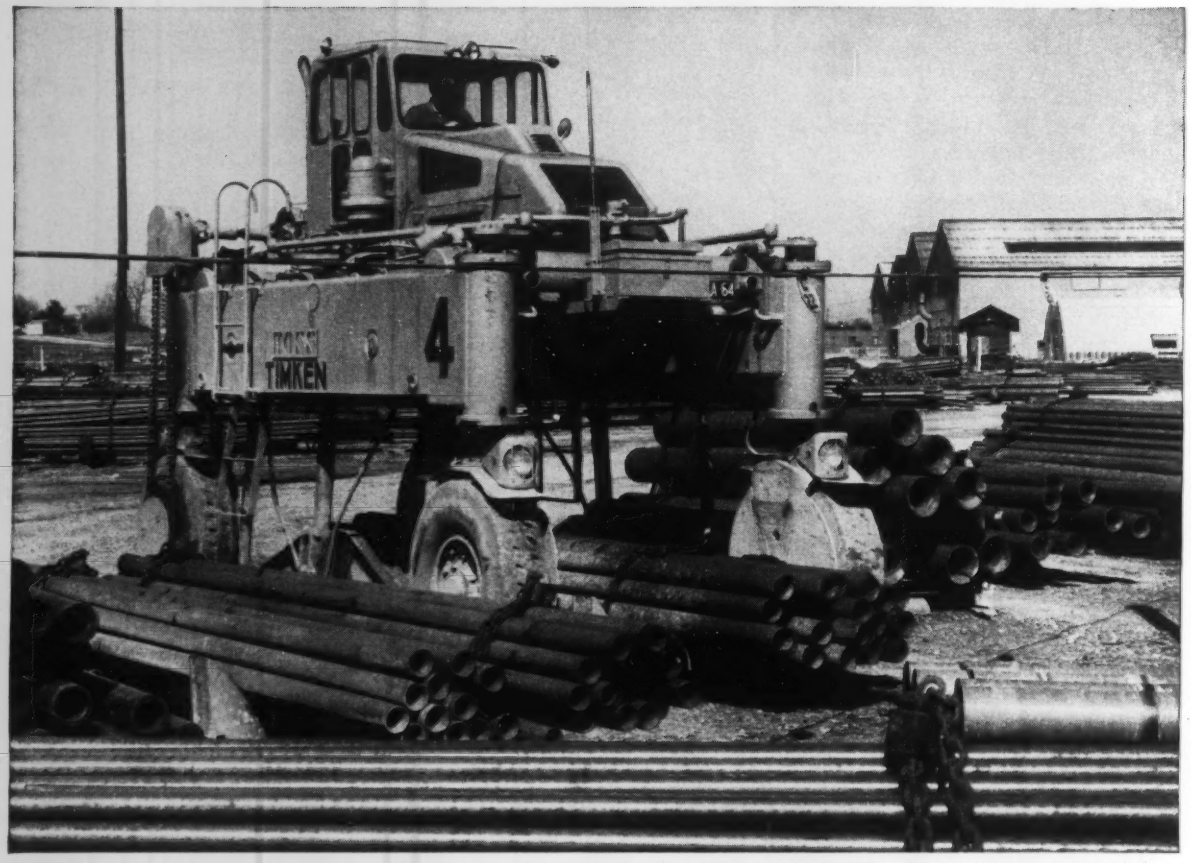

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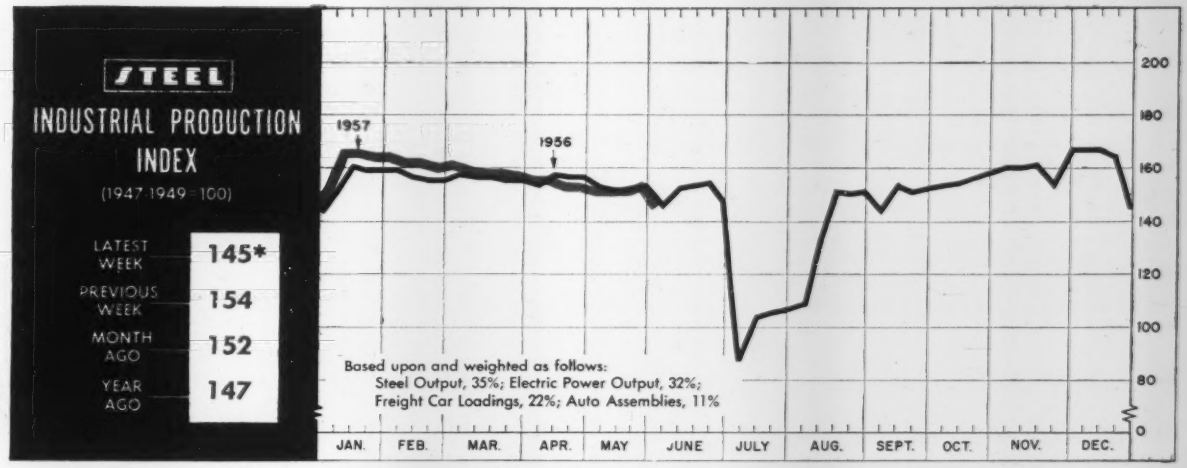

*Week ended June 1.

Optimism Returns to the Business Scene

THERE'S a strong undercurrent of optimism running through business circles these days—talk that leads one to believe that the worst of the 1957 inventory adjustment may be over.

Several factors account for this. One is the realization that so far 1957 hasn't been as bad a year as the pessimists declared it would be. In fact, the over-all picture indicates that so far it has been a little better. Through the Memorial Day week end, STEEL's industrial production index carried a weekly average of 157.9 (1947-1949=100), compared with 156.0 for the corresponding period last year. The clue to business attitudes this year comes from the weekly average of only 145.8 during the 1955 period. The 1956 gain was so pronounced that it took a little while in 1957 to adjust ourselves to the fact that we weren't going to duplicate the feat this year.

Case Studies—The four business indicators on the following two pages show what an adjustment some individual industry leaders had to make in their business thinking. Gearmakers piled up a monthly average of 245.7 (1947-1949=100) on the sales index through April this year compared with 260.7 during the year-ago period. In 1955, which was a good year, the average for the period was only 160.5. Foundry equipment makers have seen their monthly new order index average slip from last year's high of 172.4 to 144.4 for the first quarter (1947-1949=100). In 1955, it was only 111.7. Shipments of steel forgings in the first quarter totaled 428,000 tons, topping the 425,000 tons shipped in 1955's first quarter. The only thing that makes the current situation look bad is the whopping total of 471,000 tons in last year's first quarter.

April sales of industrial furnaces other than steelmaking were the poorest in a half year. The four month total is now a little over

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,274[1]	2,252	2,380
Electric Power Distributed (million kw-hr)	11,200[1]	11,574	10,598
Bituminous Coal Output (1000 tons)	9,745[1]	9,640	9,944
Petroleum Production (daily avg—1000 bbl)	7,450[1]	7,457	7,071
Construction Volume (*ENR*—millions)	$298.9	$338.9	$562.6
Auto, Truck Output, U. S., Canada (*Ward's*)	110,461[1]	158,654	108,252
TRADE			
Freight Car Loadings (1000 cars)	630[1]	723	719
Business Failures (Dun & Bradstreet)	309	264	273
Currency in Circulation (millions)[3]	$30,660	$30,645	$30,327
Dept. Store Sales (changes from year ago)[3]	−1%	−2%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,102	$23,417	$18,295
Federal Gross Debt (billions)	$274.7	$272.6	$276.6
Bond Volume, NYSE (millions)	$16.2	$20.6	$15.2
Stocks Sales, NYSE (thousands of shares)	8,676	11,179	8,679
Loans and Investments (billions)[4]	$85.6	$85.9	$85.1
U. S. Govt. Obligations Held (billions)[4]	$25.1	$25.2	$26.9
PRICES			
STEEL's Finished Steel Price Index[5]	228.59	228.59	210.45
STEEL's Nonferrous Metal Price Index[6]	231.5	231.5	275.3
All Commodities[7]	117.2[1]	117.1	114.3
Commodities Other Than Farm & Foods[7]	125.3[1]	125.2	121.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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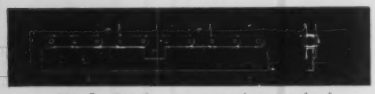
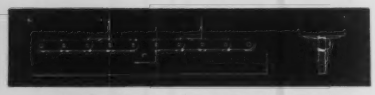
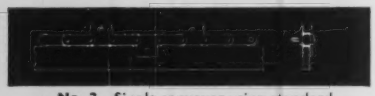


No. 1 Single conveyor using standard M35 attachment links

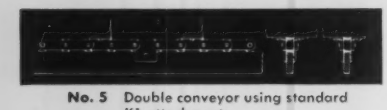


No. 2 Single conveyor using standard K1 attachment links



No. 3 Single conveyor using standard D1 or D3 pin attachments

No. 4 Double conveyor using standard M1 attachments and cross rods



No. 5 Double conveyor using standard K1 attachments

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Double pitch conveyor chains are becoming increasingly more popular in many industries where high grade finished roller chains are required, at a lower cost than the standard pitch chains. This series was developed on the basis of using standard round parts of the standard series and doubling the pitch. For example double pitch chain #C-2080 which is 2" pitch utilizes the same round parts as 1" pitch heavy series chain #80H.

In addition to being applicable for slower speed power transmission drives these chains are widely used as conveyors for the handling of materials. A standard line of attachments are available that gives this line great versatility in reference to incorporation of cross flights, cross rods, etc., that are applicable for conveyor work.

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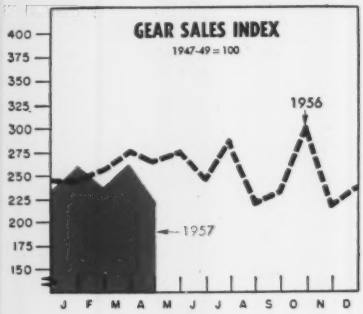
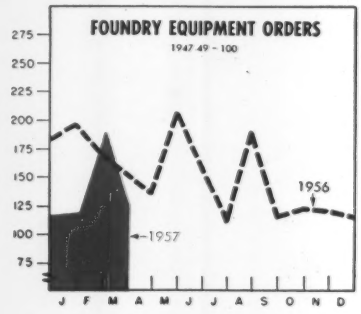
THE BUSINESS TREND



	1957	1956	1955
Jan.	259.3	245.5	140.9
Feb.	239.5	256.2	148.5
Mar.	262.4	276.5	172.8
Apr.	221.7	264.7	179.8
May	....	275.6	205.2
June	....	245.4	193.5
July	....	286.7	201.7
Aug.	....	219.5	217.6
Sept.	....	230.5	246.5
Oct.	....	299.8	227.6
Nov.	....	216.2	210.4
Dec.	....	235.7	245.5
Avg.	....	254.4	198.3

American Gear Mfrs. Assn.



	1957	1956	1955
Jan.	117.9	195.6	81.0
Feb.	188.4	169.0	90.4
Mar.	127.0	152.7	163.6
Apr.	....	135.2	178.6
May	....	207.0	145.7
June	....	156.7	186.8
July	....	110.3	213.4
Aug.	....	188.3	134.0
Sept.	....	114.7	156.7
Oct.	....	122.2	108.6
Nov.	....	121.0	154.4
Dec.	....	115.6	183.9
Avg.	....	149.0	150.0

Foundry Equipment Mfrs. Assn.

Charts copyright, 1957, STEEL.

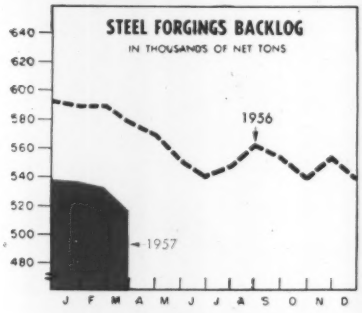
$28 million compared with about $38.2 million for the corresponding period last year. (January and February, 1956, were two of the biggest months in the industry's history.) But in the first third of 1955, the industry did only $25.5 million worth of business. At the recent meeting of the Industrial Heating Equipment Association, members felt that the expansion in the steel industry and development of new types of furnaces will help raise the 1957 total close to the 1956 record.

Reason No. 2—Many businessmen felt a letdown this spring because business, though good, wasn't as good as they had anticipated—especially in the automotive industry, where the "usual" spring splurge failed to appear for the second straight year. Many persons not even remotely connected with the industry took this as a sign of a dip in general conditions. This psychological letdown has about run its course. As we enter the summer, we expect industrial production to be reduced by vacation schedules and hot weather.

A third reason for optimism is the firmness of the steel industry. Last week, according to the American Iron & Steel Institute, operations were scheduled at 88.8 per cent of capacity, responding to what most steel officials term a "mild" upturn in orders. That's the highest rate in six weeks and produced 2,274,000 net tons of steel. Price increases are almost a certainty around July 1, and some of the beefed up production probably is the result of hedging against this boost. But orders coming in now must be considered a genuine demand for steel because it is too late to guarantee delivery by July 1.

The industry is doing better than some observers realize. Average weekly operating rate during first quarter was 96.1 per cent of capacity. So far in second quarter, it is 88.1 per cent, with the year-to-date average weekly rating pegged at 92.6 per cent. Based on a capacity of 133.5 million net tons, this average over the year would account for 123.6 million tons. Operations could skid a great deal farther without dropping beneath the record annual pace of 117 million tons turned out in 1955.

Last but Not Least—But probably the biggest source of optimism is the way new orders are beginning to pick up. Purchasing agents from practically all segments of



	Shipments		Unfilled Orders	
	1957	1956	1957	1956
Jan.	148	160	537	589
Feb.	135	152	533	589
Mar.	145	159	517	578
Apr.	...	156	...	569
May	...	151	...	551
June	...	143	...	540
July	...	98	...	547
Aug.	...	123	...	562
Sept.	...	121	...	554
Oct.	...	148	...	539
Nov.	...	135	...	553
Dec.	...	130	...	538

U.S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

	1957	1956	1955
Jan.	7,380	10,244	4,973
Feb.	8,373	12,163	5,616
Mar.	9,090	7,025	7,345
Apr.	3,164	8,803	7,639
May	....	3,620	6,205
June	...	4,748	5,812
July	...	4,140	4,338
Aug.	...	6,722	6,273
Sept.	...	3,057	8,351
Oct.	...	8,741	9,575
Nov.	....	3,986	6,180
Dec.	....	5,858	11,105

*Not including new orders for steel mill furnaces.
Industrial Heating Equipment Assn. Inc.

the economy report this. STEEL talked to many of them at their annual meeting last month in Atlantic City, and there wasn't a pessimist in the crowd. They admitted that new orders were off in late first and early second quarters, but within the last few weeks the tempo has increased.

Philadelphians Expand

Manufacturers in the Philadelphia metropolitan area plan to increase their capital expenditures in 1957 by 20 per cent over 1956, reports the Federal Reserve Bank of Philadelphia. That would total $403 million compared with last year's $337.2 million. Business optimism in this area can be measured from the fact that in the fall these manufacturers anticipated spending only $380.6 million in capital improvements this year. Between the two surveys, durable goods manufacturers upped their sights 23 per cent while nondurable goods producers drew back 3 per cent.

Trends Fore and Aft

• Contracts for highway construction during the first 22 weeks of 1957 total $1228.3 million, 23 per cent above the corresponding 1956 figure, reports *Engineering News-Record.*

• The new order index of the American Supply & Machinery Manufacturers' Association Inc. in April dipped 7 points to 203 (1947-1949=100), seasonally adjusted. A year ago, it was 195.

• Billings in April reported by members of the Metal Treating Institute totaled $3,462,600, a gain of 9.4 per cent over the year-ago month. To date, 1957 is 8.9 per cent ahead of the corresponding period of 1956.

• Consumers went $259 million deeper into installment debt in April, reports the Federal Reserve Board. This was the largest monthly rise in 1957, but it was still below the increases posted in the like months of 1956 and 1955.

• General Electric Co. will raise factory prices on its 1958 line of washers and dryers by 4 to 7 per cent.

• If June schedules are maintained, motordom will produce 3,392,015 passenger cars in the first half, says *Ward's Automotive Reports.* That will be an increase of about 6 per cent over the first half of 1956.

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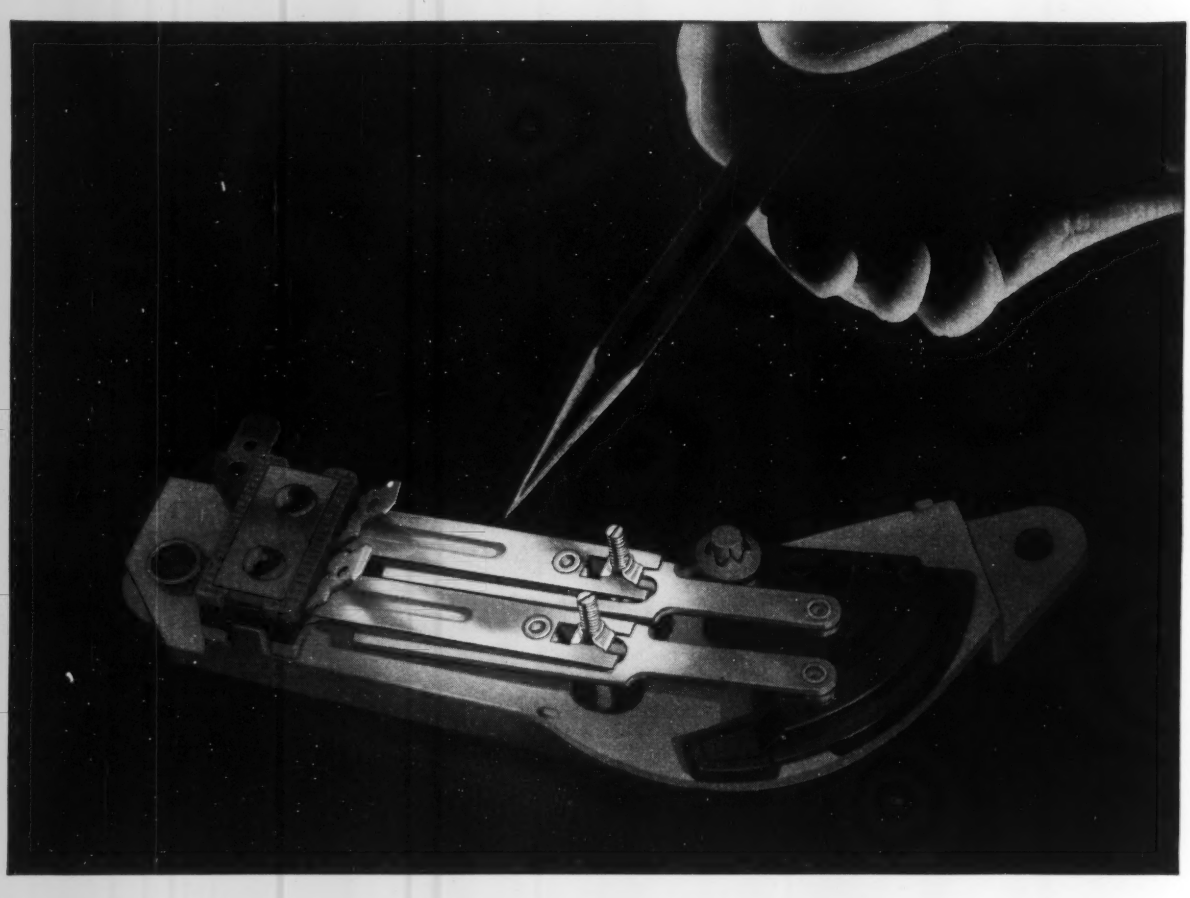

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Canada: Dominion Fasteners, Limited, Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Limited, Treforest, Wales. *France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse, Levallois (Seine). *Germany:* Hans Sickinger GmbH "MECANO", Lemgo-i-Lippe.

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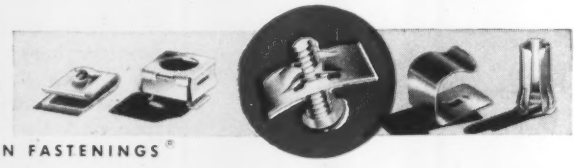
Speed Nuts®

FASTEST THING IN FASTENINGS®



HARRY M. WEBSTER
Porter Inc. v. p.

HORACE Y. BASSETT
Calumet & Hecla president

EUGENE CALDWELL
Baker-Raulang president

EUGENE L. MILLER
Cooper-Bessemer president

Harry M. Webster was elected vice president, **H. K. Porter Inc.**, Somerville, Mass. He was sales manager in charge of trade sales.

Horace Y. Bassett, executive vice president, was elected president and chief executive officer of **Calumet & Hecla Inc.**, Chicago. He succeeds **Endicott R. Lovell,** now chairman of the board and chairman of the executive committee.

Andrew L. Pontius was elected a vice president of **Illinois Tool Works.** He continues as general manager of its Shakeproof Division in Elgin, Ill.

Howard A. Fitch Jr. was elected president and general manager, **Kansas City Structural Steel Co.**, Kansas City, Kans. **Neil G. Lilley** was elected chairman; **John P. Cooper,** vice president-treasurer; **J. A. Vance,** vice president-secretary and general sales manager; **Glenn A. Smith,** vice president and works manager; **John S. Harrow,** director of purchases.

John H. Platts was made general manager of the Evansville, Ind., division of **Whirlpool Corp.**

Scovill Mfg. Co., Waterbury, Conn., appointed **S. O. Drivdahl** regional sales manager of its general manufacturing division and its forging and screw machine division. He covers Rochester, N. Y., Cleveland, Pittsburgh, Cincinnati and Philadelphia districts.

Donald P. McIntosh was named vice president and general manager, **Spangled Iron & Steel Works,** San Diego, Calif.

Eugene Caldwell was elected president of **Baker-Raulang Co.**, Cleveland. Formerly vice president and general manager of Hyster Co., he succeeds **Percy L. Douglas** who continues as executive vice president of Baker's parent company, Otis Elevator Co.

Schuyler C. Reber was made sales manager, automotive lift division, **Rotary Lift Co.**, Memphis, Tenn. **Allan Robinson,** former vice president in charge of the division, retired due to ill health, but has been retained in an advisory capacity. Mr. Reber was sales manager of American Saw & Tool Co.

F. V. Gieryn was made sales manager, industrial department, **Vickers Inc.**, Detroit. He was manager of export sales. **Robert A. Erskine** was made chief engineer, industrial department. **Carl E. Gunther** was made chief engineer, marine and ordnance department.

Fairbanks, Morse & Co., Chicago, appointed **A. B. Parker** sales manager, mechanical sales, scale division. Now in Chicago, he was manager of the scale department, San Francisco branch. He is succeeded by **C. E. Marion**, former manager for the department at the Oakland, Calif., scale manufacturing operations.

R. D. Rowley was named manager of **Westinghouse Electric Corp.'s** metals plant at Blairsville, Pa. He succeeds **Warren M. Trigg,** named manager of the motor department, motor and control division, Buffalo, succeeding **A. H. Heywood,** who resigned for reasons of health.

Eugene L. Miller was elected president and general manager, **Cooper-Bessemer Corp.**, Mt. Vernon, O. He was assistant general manager. **L. F. Williams,** former president, is chairman.

John W. Coffey was made chief metallurgist, foundry division, **Hansell-Elcock Co.**, Chicago. He was metallurgist at Gunite Foundries Corp.

Howard H. Cherry Jr. was elected president of **Cherry Burrell Corp.**, Chicago, to succeed **John G. Cherry,** who continues as a director. **D. H. Burrell III** resigned as vice president-operations, but continues on the board.

Edward M. Van Winkle was appointed general manager, **Magnus Metal Division,** National Lead Co., New York, succeeding **John P. Borda,** retired. Mr. Van Winkle continues as president of Magnus Metal Corp., subsidiary of National Lead. **John A. Mardick** was made production manager of the division.

E. M. White was made sales manager, mining division, **Mine Safety Appliances Co.**, Pittsburgh. He was assistant manager. **W. C. Hamilton** was made mining operations manager.

Wallace M. Schleicher joined **C & D Batteries Inc.**, Conshohocken, Pa., as manager, motive power and railroad sales. He was general sales manager for Edison Storage Batteries.

Roger L. Daniels was made chief engineer of **Formsprag Co.**, De-

C. E. SUTHERLAND
Bailey Meter v. p.-mfg.

JOHN R. WARREN
Panellit Service post

JOHN C. MILLER
Skidmore Gear exec. v. p.

DR. JOHN P. SACHS
heads Patterson Foundry eng.

troit. He was project engineer.

Bailey Meter Co., Cleveland, elected **C. E. Sutherland** vice president-manufacturing. He was factory manager. **E. O. Stern**, auditor, was elected treasurer and assistant secretary.

William H. Welch was elected president of **Sleeper & Hartley Inc.**, Worcester, Mass., and continues as treasurer. **Richard S. Russell** was made vice president-production.

William D. Cleeves was made assistant manager of engineering at **Blaw-Knox Co.'s** construction equipment division at Mattoon, Ill.

Paul S. Nurko was made general superintendent, manufacturing division, **De Laval Steam Turbine Co.**, Trenton, N. J. **Leonard Schwarz** was made superintendent of the main shop. **Kenneth Lippincott** was made superintendent, standard products shops; **Milton Hammond**, superintendent, turbocharger shops; **Joseph Basso**, supervisor of manufacturing research, dealing with special tooling and equipment problems.

E. W. Brown was made works manager at the Linden, N. J., plant of **National Electric Products Corp.** He succeeds **F. J. O'Reilly**, now general manager of manufacturing for the firm. **E. M. Nelson** was named Chicago district manager. Formerly midwestern regional manager, he is succeeded by **H. E. Colliver**. **W. R. McCaskey** was made Pittsburgh district manager to replace **D. F. Dimock**, now mideastern regional manager succeeding Mr. Colliver.

John R. Warren was appointed general superintendent, contracting division, **Panellit Service Corp.**, Skokie, Ill., a subsidiary of Panellit Inc.

John C. Miller fills the new post of executive vice president, **Skidmore Gear Co.**, Cleveland. He continues as general manager.

Crucible Steel Co. of America appointed **Charles D. Preusch** chief metallurgist of its Spaulding Works in Harrison, N. J. He was foundry metallurgist at the works.

International Business Machines Corp. appointed **Harold E. Schmit** manager of manufacturing control for its data processing division, with headquarters in New York. He was manager of the company's sales office in Ft. Wayne, Ind.

Allan D. Blackledge was made assistant manager, **Cameron Iron Works Inc.**, Houston. He was manager of the special products department.

V. James Ford was made manager of the Detroit district office of ElectroData Division, **Burroughs Corp.** He succeeds **James A. McCullough** who joined the international division.

George L. Todd was elected a vice president of **Burroughs Corp.**, Detroit. He is president of Todd Co. Inc., Rochester, N. Y., a subsidiary.

Keith N. Stought was made plant manager, industrial crane and hoist, **Ingersoll Products Division**, Borg-Warner Corp., Chicago. He was assistant to the works manager and chief industrial engineer.

Dr. John P. Sachs was made director of engineering and product development, **Patterson Foundry & Machine Co.**, East Liverpool, O., subsidiary of Ferro Corp. He was supervisor of chemical process engineering and development at Visking Corp.

Chase Brass & Copper Co., Waterbury, Conn., promoted **George Sengstacken** from works manager, Chase Metal Works, to assistant vice president-operations. He is succeeded by **Gilbert R. Boutin**, former assistant works manager.

Earl V. Akerlow was made division manager, engineering department, **Kaiser Engineers**, division of Henry J. Kaiser Co., Oakland, Calif.

Nathaniel B. Nichols was made chief engineer for **Taylor Instrument Companies**, Rochester, N. Y. He succeeds **Ralph E. Clarridge**, named to the president's staff as specialist for new products.

Robert A. Schafer was made director of engineering, **Baker Bros. Inc.**, Toledo, O. He was an engineering executive with National Automatic Tool Co.

Robert G. Reinwald was elected president of **Jaycee Chemical Corp.**, Northford, Conn. **Gar Hewson** was elected vice president; **Philip Evans**, director of sales; **Walter B. Dundon Jr.**, assistant to the president; **Carl Truebe**, director of product development and production.

Russell W. Wetjen was appointed sales manager for petroleum, LP-gas and industrial meters of **Neptune Meter Co.**, New York. He succeeds **Walter H. Sieger**, who was

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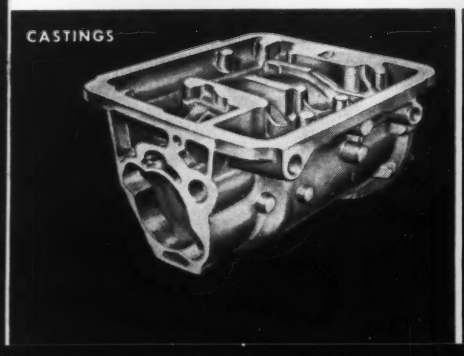
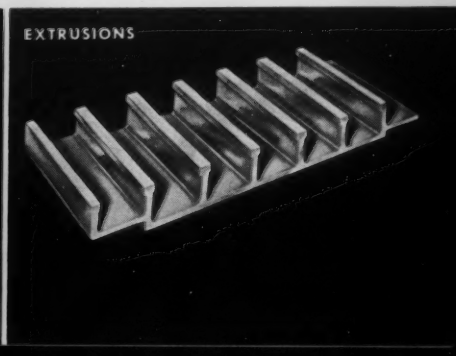




JOHN V. EAKIN
Fawick Corp. v. p.

MAX B. MORDEN
Commercial Contracting v. p.

JOSEPH R. GREER
Beckman & Whitley chief eng.

DAVID W. DEWEY
Knickerbocker div. sales mgr.

PERRY A. WHITE
manager of B-L-H div.

S. C. AMREN
Charles Bruning v. p.

elected president of Revere Corp. of America, a subsidiary.

John V. Eakin was elected vice president, **Fawick Corp.**, Cleveland. He continues as general manager of the Airflex Division.

Max B. Morden was appointed vice president - sales for **Commercial Contracting Corp.**, Detroit. He was sales manager.

Harry L. Gaddis was made superintendent, railroad wheel works department, Butler, Pa., Works, **Armco Steel Corp.**

Cooper-Bessemer Corp., Mt. Vernon, O., appointed **William F. Hartwick** supervisor of compression engineering to succeed **Bruno Thiel**, retired. **R. F. Kymer** was made assistant chief engineer, products division; **M. J. Helmich**, assistant chief engineer, development division.

Gene Lowe was made vice president - manufacturing, **Benson-Lehner Corp.**, Los Angeles.

Joseph R. Greer, former project engineer, was made chief engineer at **Beckman & Whitley Inc.**, San Carlos, Calif. He succeeds **Ernest M. Whitley**, co-founder, resigned.

David W. Dewey was made sales manager, Truck - Man Division, **Knickerbocker Co.**, Jackson, Mich.

Perry A. White, general controller, **Baldwin - Lima - Hamilton Corp.**, Philadelphia, was appointed vice president-general manager of its Eddystone Division, Eddystone, Pa. **Robert G. Tabors**, vice president-assistant general manager, Hamilton, O., Division, was named vice president-general manager, electronics and instrumentation division, Waltham, Mass. Mr. White succeeds **Joseph J. Rosecky**, who has left the company.

S. C. Amren was made vice president - manufacturing for **Charles Bruning Co. Inc.**, Chicago. He was vice president-general manager, A.M.F. Cycle Co. and Cleveland Welding Division, both divisions of American Machine & Foundry Co.

Thomas A. Moretti, acting plant manager, Marion Forge Division, Marion, O., **Eaton Mfg. Co.**, was named plant manager.

Warner Kenyon and **Lars R. Larson** were made assistant works engineers at the Ashland, Ky., Works of **Armco Steel Corp.** Mr. Kenyon is in charge of operations. Mr. Larson is in charge of development and construction.

Cuno Engineering Corp. appointed **Walter J. Holder** manager of its Micro-Klean Filter Division, Meriden, Conn.

OBITUARIES...

Joseph B. Armitage, 76, vice president, consultant and former engineering vice president, **Kearney & Trecker Corp.**, Milwaukee, died May 30.

Albert William Schede, 68, president, **Belmont Iron Works**, Philadelphia, died June 1.

Albert A. Ohmer, 57, manager of forging sales at **Erie Forge & Steel Corp.**, Erie, Pa., died May 23.

Walter S. Schiffler, vice president-engineering, **Talon Inc.**, Meadville, Pa., died May 24.

Maurice J. McCarthy Jr., 50, commercial vice president, **Anaconda Wire & Cable Co.**, New York, died May 24.

Fred W. Busche, 64, president, **General Foundries Co.**, Milwaukee, died May 26.

Don K. Hallauer, president and general manager, **Service Iron & Steel Co.**, Akron, died May 11.

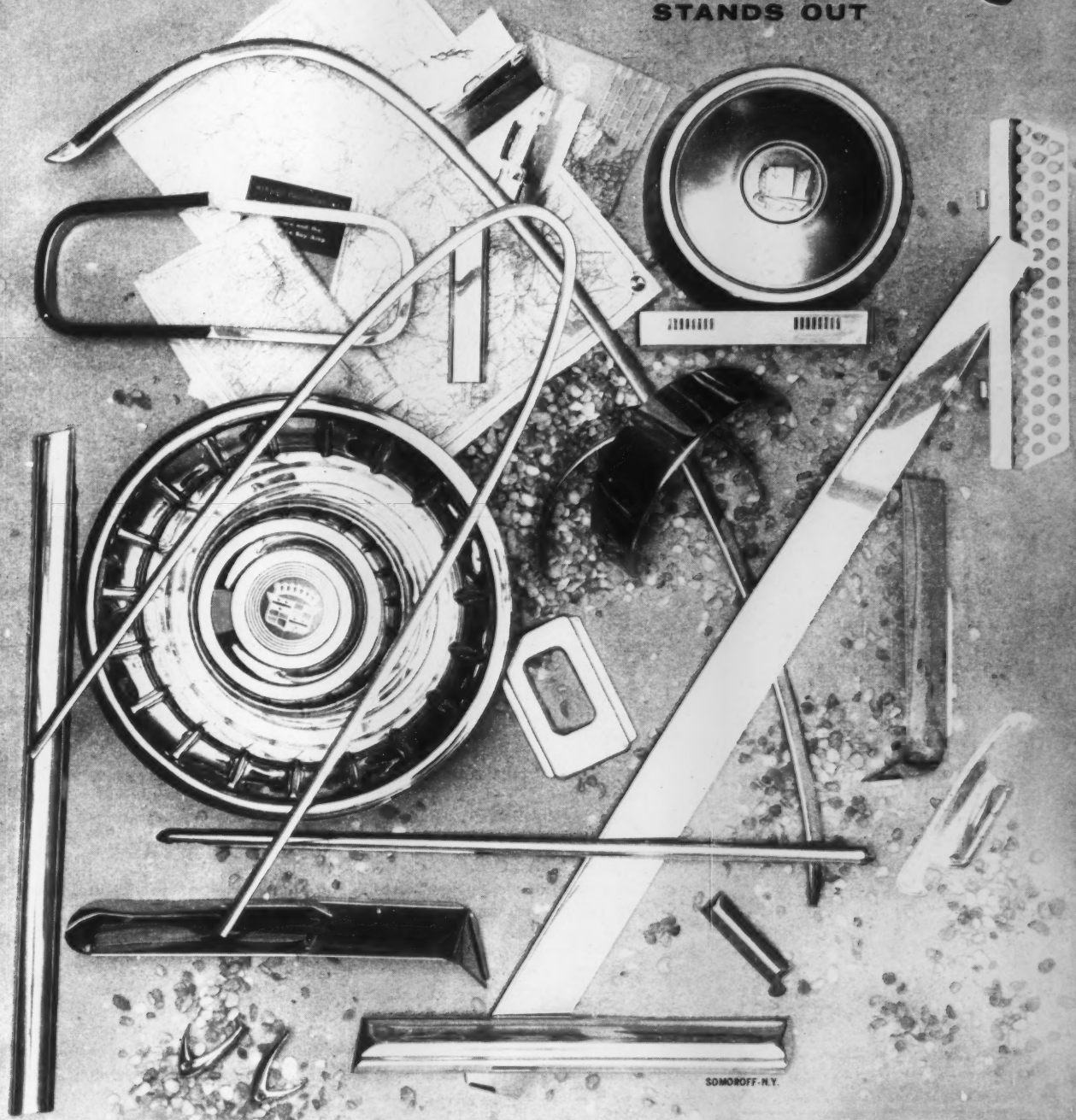
Hubert Hollmann, executive engineer, **Brad Foote Gear Works Inc.**, Chicago, died May 22.

John W. McKean, 76, vice president and superintendent, **Titan Tool Co.**, Fairview, Pa., died May 20.

Jorgen C. Andersen, owner of **Jorgen Co.**, Rochester, N. Y., died May 20.

L. Paul Ahlers, 50, executive assistant to the general manager and director of quality, engine division, **Fairchild Airplane Corp.**, Farmingdale, N.Y., died May 29.

IN AUTOMOTIVE TRIM, TOO, **Sharonsteel Quality** STANDS OUT



Only Stainless Steel has really *lasting* beauty that defies flying stones, road chemicals, salt air, rust and corrosion season after season. Discerning automotive designers used more Sharon Stainless Steel this year than ever before for exterior and interior trim and accessories.

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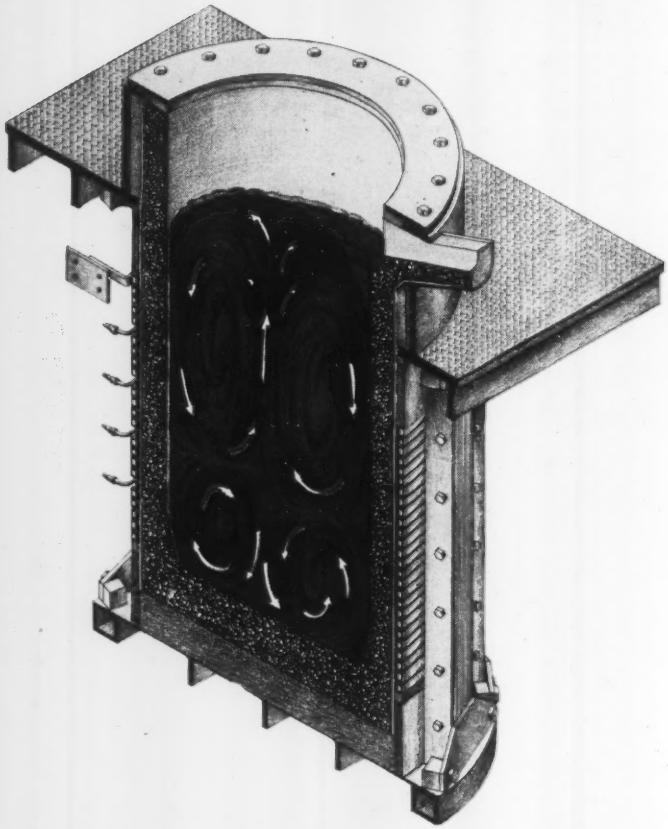
a new principle in 60 Cycle induction melting

WHAT IT IS

WHAT IT CAN DO

May We Explore the Possibilities of this New Method with You?



- A cylindrical induction coil supplied with ordinary 60 cycle current induces heat and vigorous electromagnetic stirring in the molten metal charge.

  Integrated electric controls regulate power, maintain high power factor automatically.

  Monolithic refractory linings are made by ramming against the sturdy water-cooled coil held in a rigid frame of magnetic and structural steel.

  This new principle was perfected in Europe over the last seven years. Over 100 Junker furnaces are now in use. AJAX-JUNKER designs are based on latest experience, using American components and practices throughout.

- Outstanding results are proven in these fields:

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  RECOVERY OF ALUMINUM SCRAP

Available sizes range from 1 to 10 tons, with normal melting cycles from 2 to 4 hours. Power ratings are 200 kw through 1500 kw.

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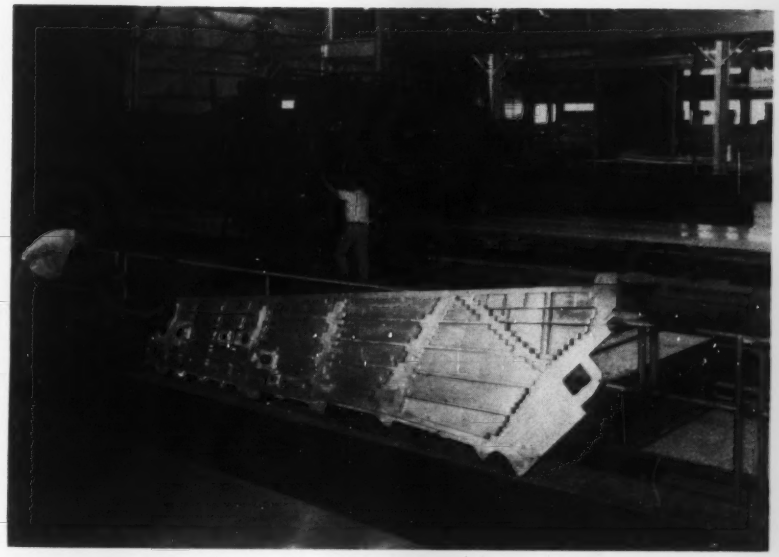


Navy-Reynolds project is developed to produce . . .

Sculptured Airplane Wings

TAPERED-plate, single wing sections with integral stiffeners and milled contours like the one pictured above will be produced at Reynolds Metals Co.'s $20-million naval facility at McCook, Ill.

Key equipment of the new operation includes a 145-in. taper mill to produce sheets and plates of uniform thickness or tapered dimensions; a plate stretcher with a pulling force of 16 million lb; and twin, fixed bed, gantry type skin millers which have a workbed over 100 ft long.

The facility, says R. S. Reynolds Jr., president, was designed to meet the demands of the aircraft industry for large, sculptured sections which perform functions that normally require hundreds of smaller parts. Under its agreement with the Navy, Reynolds will be able to use the facilities for commercial orders after meeting military requirements.

Commercial Uses—Reynolds expects to find an expanding commercial market for large sculptured aluminum plates. Two examples of work already done: Plates for shipbuilding and containers used in chemical processing industries.

The Navy facility was designed for complete integration with plate and sheet facilities at McCook. Monthly capacity of the plant is 30 million lb of aluminum plates and flat, coiled, corrugated, embossed and painted sheets.

American Safety Razor Renamed

American Safety Razor Corp., New York, changed its name to A.S.R. Products Corp., effective July 1.

Security Steel Opens Offices

Security Steel Co. has opened offices at 4101 San Jacinto, Houston, and is looking for a warehouse location. The new firm will distribute steel products, specializing in heavy steel plates.

Eaton Metal Forms Subsidiary

Eaton Metal Products Co., Denver, fabricator of pressure vessels, tanks and specialty metal products, organized a subsidiary, Eaton Research & Development Co. It will do work in chemical and mechanical engineering, physics and related fields of science. Later on, it will branch into light manufacturing, making products resulting from development work.

Gets Aluminum Plant Contract

American Brass Co., Waterbury, Conn., an Anaconda Co. subsidiary, awarded a $5-million contract to Eichleay Corp., Pittsburgh, for the completion of its aluminum plant at Terre Haute, Ind. The 400,000 sq-ft facility will produce aluminum strip, sheets, tubing and shapes. Besides machinery and equipment installation, the contract covers installation of all auxiliary structures and facilities. About a year and a half will be required to complete the project.

Airco To Enlarge Lorain Plant

Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York, plans a $3-million expansion that will more than double production facilities for gaseous and liquid oxygen at Lorain, O. Daily capacity of the plant will be boosted from 985,000 to 2,235,000 cu ft. The project will take about a year to complete and is part of Airco's $24-million general expansion program for 1957.

Rowan Controller Co. Builds

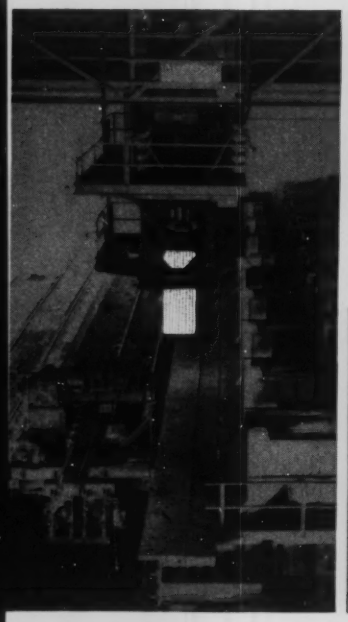
Rowan Controller Co., Baltimore, manufacturer of electrical apparatus, is erecting a 35,000 sq-ft branch plant in Carroll county, Maryland. It will move two manufacturing units to this new location by late August. The company has acquired land in Baltimore county at Old Court and Liberty roads for a new plant which will house the remaining departments.

Gabriel Moves Ward Products

Gabriel Co., Cleveland, moved the operations of its division, Ward Products Corp., from Ashtabula, O., to Amsterdam, N.Y. Basically a manufacturer of automotive and communication antennas, Ward Products is expected to eventually allocate part of its production to some of the new electronic components being readied for the market by Gabriel's Electronics Divi-

(*Please turn to page* 130)

READY



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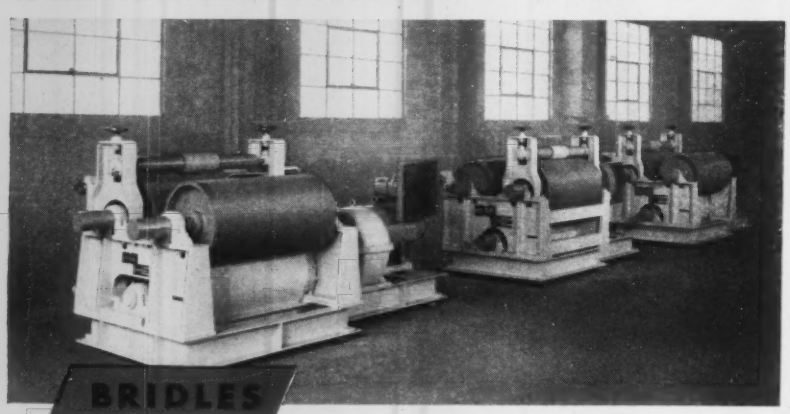

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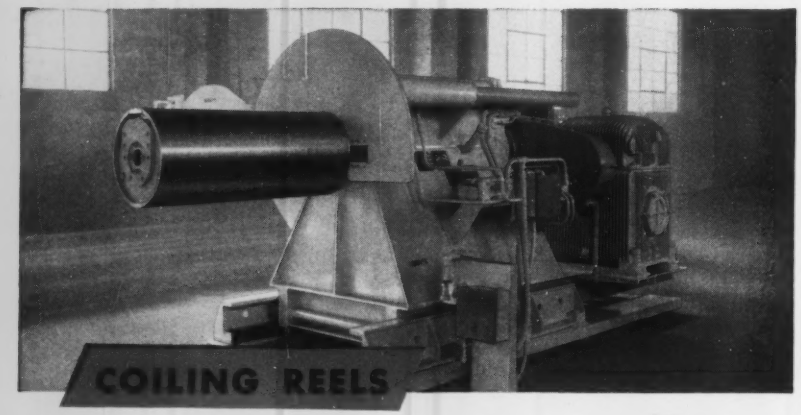

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CLEVELAND, INDIANAPOLIS AND BERKELEY, CALIFORNIA

(*Concluded from page* 127)

sion, Boston. More than $400,000 worth of machinery is being installed in the Amsterdam plant.

Opens Schenectady Office

Baldwin - Lima - Hamilton Corp., Philadelphia, opened a sales office at 509 State St., Schenectady, N. Y. Frances W. Klotz will be in charge of sales of rings, flanges, forgings and castings produced by the Standard Steel Works Division, Burnham, Pa. C. K. Johnson will handle the Electronics & Instrumentation Division's (Waltham, Mass.) line of testing equipment.

Walworth To Build Plant

Walworth Co., manufacturer of valves and pipe fittings, will build a $5-million plant and research center in Braintree, Mass. The firm's operations, now in 18 buildings in Boston, will be consolidated at Braintree.

Boosts Casting Capacity

Pelton Steel Casting Co., Milwaukee, will increase its casting capacity by about 45 per cent. The program involves an addition of 44,000 sq ft to the 133,000 sq-ft plant. When completed in 1959, monthly capacity will be about 300 tons larger (it's now 650 to 700 tons).

Opens West Coast Warehouse

All-State Welding Alloys Co., White Plains, N. Y., opened a warehouse at 4933 Firestone Blvd., South Gate, Calif. The firm's alloys and fluxes for welding, brazing, soldering, tinning and cutting will be stocked. Harry Peacor is regional manager.

Seneca Steel Buys Property

New York Central Railroad is selling virtually all its car shops in East Buffalo, N. Y., to Seneca Steel Service Inc., Buffalo. Seneca Steel, a subsidiary of Production Steel Coil Co., Detroit, plans to establish a steel warehousing operation on the property which will handle steel bars, structurals and heavy plates. The present warehousing operation (flat-rolled steel

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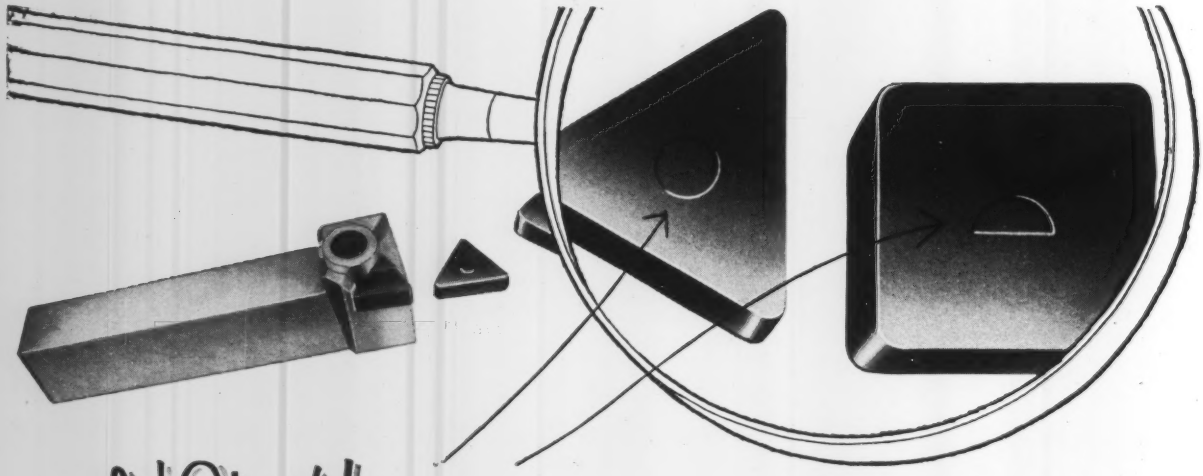

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▲ ▲	Semi-circle	CA-605	Precision boring steel Light, fast cuts	C-8
▲ ▲	Triangle	CA-606	Light, fast machining on steel	C-7
● ●	Circle	CA-608	Light to medium machining on steel	C-7
◆ ◆	Diamond	CA-609	General machining on steel Medium to medium heavy cuts	C-6
▬ ▬	Rectangle	CA-610	General machining on steel Heavy roughing cuts	C-6

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AL® FINE TOOL STEELS SINCE 1854

WSW 6390

products and production of cold-rolled strip) will continue at the Seneca Steel plant, 1050 Military Road, Buffalo.

Processes Transmission Pipe

Southern Pipe Coating Co. opened a plant in Doraville (Atlanta), Ga., to apply coatings and wrappings to gas and gasoline transmission pipe. Its capacity is 12 miles of pipe a day. The plant was equipped by Crutcher-Rolfs-Cummings Inc., Houston, producer of machinery for coating and wrapping.

Pennsylvania Salt Renamed

Pennsylvania Salt Mfg. Co., Philadelphia, changed its name to Pennsalt Chemicals Corp.

CONSOLIDATIONS

White Motor Co., Cleveland, purchased the assets of **Reo Motors Inc.,** Lansing, Mich., from Bohn Aluminum & Brass Corp., Detroit. The new property will be operated under the direction of John C. Tooker, general manager, Reo Division.

NEW ADDRESSES

DeVilbiss Co., Toledo, O., moved its direct factory branch for northern California to 1335 N. 10th St., San Jose, Calif. D. L. Bohon is divisional sales manager.

Paxton Products, Los Angeles, a subsidiary of McCulloch Motors Corp., is moving to 929 Olympic Blvd., Santa Monica, Calif. The firm makes automotive supercharger kits.

Yarborough Sales Co., which represents producers of electronics and electrical raw materials, moved to 2636 Mission St., San Marino, Calif.

Maserati Corp. of America moved to larger quarters at 46 Sea Cliff Ave., Glen Cove, L. I., N. Y. Facilities will be maintained for

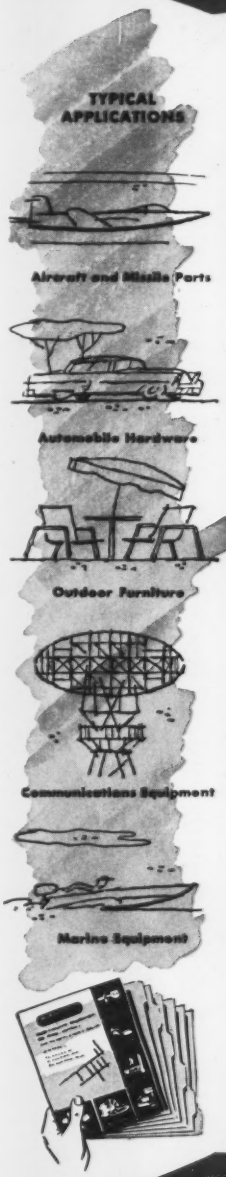
(*Please turn to page* 136)

look at these advantages of

IRIDITE FINISHES

for

CORROSION-RESISTANCE, PAINT BASE on ALUMINUM and MAGNESIUM



EASE OF USE—Iridite is a simple chromate conversion treatment. Fast, easy, economical. You just dip, brush or spray it on the part at room temperature. No special equipment. No specially trained personnel.

OUTSTANDING PERFORMANCE—Forms a film that is an integral part of the metal itself. Can't flake, chip or peel. Takes paint firmly on initial application, and the bond lasts. Even protects areas scratched in use.

LOWEST COST—You have only minimum equipment cost, no special racks, high speed operation, lower overall handling costs.

CHOICE OF APPEARANCE—Clear coatings that retain metallic lustre to dark, maximum protection coatings. A variety of colors is available by dyeing.

IRIDITE #14 and #14-2 (Al-Coat) for ALUMINUM

Two specially formulated finishes that give you maximum latitude in aluminum treatment. Both provide excellent corrosion protection and paint base. Iridite #14-2 is an improved product that allows greater flexibility in operation and coating thickness and produces the optimum in corrosion protection.
Either coating provides corrosion resistance superior even to complicated electrolytic treatments in a fraction of the time. These coatings also offer many other valuable characteristics: they have low electrical resistance, they aid in arc-welding, provide a good base for bonding compounds, have no effect on the dimensional stability of close-tolerance parts. Final appearances ranging from clear through yellow iridescence to full brown can be obtained. By dyeing, you can produce red, green, blue, orange or yellow finishes.

IRIDITE #15 for MAGNESIUM

Produces a protective, paint base film with corrosion resistance at least equal to that obtained from long, high-temperature dichromate treatments in a fraction of the time and at room temperature. The appearance of the coating can be varied from light brown to dark brown and black.

APPROVED UNDER GOVERNMENT AND INDUSTRIAL SPECIFICATIONS

SEE FOR YOURSELF WHAT IRIDITE CAN DO . . . SEND SAMPLE PARTS FOR FREE PROCESSING. Look at the results, test the protection, evaluate the savings. Also write for handy Reference File of the most complete data published on chromate conversion coatings. Or, for immediate information, call your Allied Field Engineer. He's listed under "Plating Supplies" in your classified phone book.

ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD

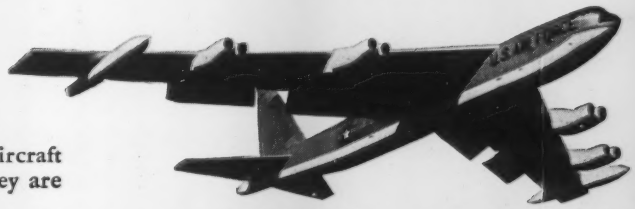
Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals; ARP Plating Chemicals.
West Coast Licensee—L. H. Butcher Co.

Republic Makes the Steels for Flight

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels



TITANIUM IN THE BOEING B-52 saves 400 pounds in gross weight. Jet engine pods for this history-making, global bomber are fabricated by Bell Aircraft Corporation from titanium supplied by Republic and other producers. Titanium was selected for this application because of its lightness, strength, and corrosion-resistance. It offers the highest strength-to-weight ratio of construction metals. Titanium's extremely high corrosion-resistance makes it attractive for missile applications, such as fuel tanks. Nitric acid has little effect on titanium. It is immune to the corrosive action of salt water and sea air. Write for more facts.

Republic Steel is the world's largest producer of aircraft steels. And include guided missiles in aircraft. They are fast becoming a sizable steel consumer.

Steels furnished to the aircraft industry are as different as night and day. Requirements may individually call for strength, heat-resistance, corrosion-resistance, wear-resistance, high strength-to-weight ratio, ductility—or any combination of these factors.

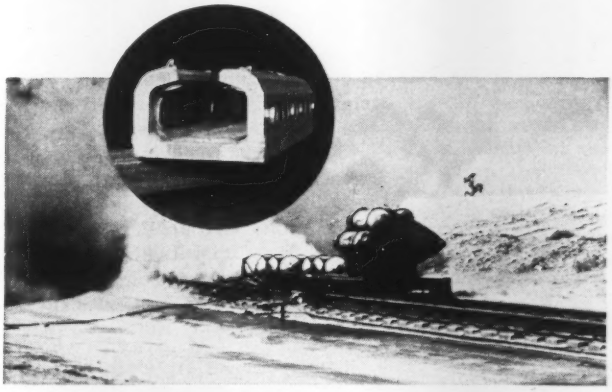
One reason for Republic Steel's prominence in this field is that Republic *makes a wide variety of the steels required.* Another reason is its metallurgical service teams—field, mill and laboratory metallurgists with years of experience gained through helping hundreds of designers and manufacturers solve problems similar to yours.

Now that the sound barrier has been passed and the next goal in sight is the "thermal thicket," material selection becomes even more important. To date two materials, titanium alloys and stainless steel, best qualify to meet high skin temperatures resulting from aerodynamic heat. Republic produces both of these metals in billets, hot rolled and cold finished bars, plates, sheets, and strip.

Republic Alloy Steels have played a prominent part in the development of operating and structural parts free from excess weight, yet tough and strong to withstand shock, impact, strain and vibration.

Our metallurgists and engineers are always available to work with your own personnel in using these Republic products to best advantage. The service is obligation-free and confidential. Send us the coupon if you would like metallurgical assistance.

ALLOY STEEL IN THE NORTH AMERICAN F-100 landing-gear struts provides strength, toughness, maximum resistance to fatigue. The struts are made by Bendix Product Division, Bendix Aviation Corporation. Exacting requirements for inner and outer cylinders resulted in the development of new grade of steel by Bendix and Republic metallurgists working in cooperation with North American engineers. This new steel, designated AMS 6427, was found ideal for application in the strength range of 220,000-240,000 psi. It maintains its great strength at wide temperature extremes. Republic metallurgists are available to help with your projects.



STAINLESS STEEL HELPS SPEED ROCKET SLED to world's record of 1560 miles an hour. The sled, designed and built by Convair Division of General Dynamics Corporation, is used in supersonic tests to evaluate the effect of rain erosion on aircraft and missile parts. The sled rides rails on slippers made of SAE 4130 Alloy Steel. Within each slipper (see photo inset) are stainless steel inserts, Type 321, of which Republic is a supplier. The inserts serve as a lubricant to reduce friction by shucking off metal particles at a temperature of 1500°F. The stainless inserts reduce friction so effectively that engineers no longer take it into account in calculations of sled performance.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. C-3689
3120 EAST 45TH STREET
CLEVELAND 27, OHIO

Please have a metallurgist call:
☐ Stainless ☐ Titanium ☐ Alloy

Send more information on these Republic products:
☐ Titanium ☐ ENDURO® Stainless Steel ☐ Alloy Steel

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

new . . . booming . . . stainless steels call for consistent analysis

MANGANESE	99.9% MINIMUM
CARBON	0.004% MAXIMUM
SULPHUR	0.024% MAXIMUM
IRON	0.001% MAXIMUM
HEAVY METALS	0.005% MAXIMUM
PHOSPHORUS	NOT DETECTABLE IN 25 GRAM SAMPLE
SILICON	SPECTROGRAPHIC TRACES ONLY
HYDROGEN	0.015% MAXIMUM

and ELECTROMANGANESE® has it

Stainless steel is on the move. Industry after industry is attracted by its recent strides in transportation equipment, appliances, architectural trim, household and store furnishings. And of all the stainless steels, the most stimulating seem to be the new 200 Series, characterized by high manganese, low nickel, content.

But—high manganese content also means consistent analysis in this critical alloying agent. The percentage of each impurity must be known and consistent in melt after melt. This calls for the purest commercial manganese available . . . Foote electrolytic manganese. Electromanganese, by trade name, consistently provides 99.9% manganese content in the analysis shown above. If you have a hydrogen problem, even this can be reduced to 7.5 ppm maximum in a *Hydrogen-Removed* grade. Nitrided manganese is available in Foote's high-purity Nitrelmang.® But just as important as consistent analysis is economy. And here Foote's alloying agents enable you to get the necessary manganese content in the most efficient way.

The 17 years' experience in manganese alloying available from Foote's Electromanganese Division is an important first step when you decide to really pursue the growing stainless steel market. A letter will bring a Foote engineer to your desk. Or, you can get further information by writing to our Technical Literature Department, Foote Mineral Company, 411 Eighteen West Chelten Building, Philadelphia 44, Pa.

Foote MINERAL COMPANY

SALES OFFICE: *Electromanganese Division, Knoxville, Tennessee*
RESEARCH LABORATORIES: *Berwyn, Pennsylvania*
PLANTS: *Cold River, N. H.; Exton, Pa.; Kings Mountain, N. C.; Knoxville, Tenn.; Sunbright, Va.*

ELECTROLYTIC MANGANESE METAL • WELDING GRADE FERRO ALLOYS • STEEL ADDITIVES • COMMERCIAL MINERALS AND OXIDES • ZIRCONIUM & TITANIUM (IODIDE PROCESS) • LITHIUM METAL, CHEMICALS AND MINERALS • STRONTIUM CHEMICALS

(*Concluded from page* 133)

the testing and demonstration of precision machine tools and parts imported by the firm.

ASSOCIATIONS

American Gear Manufacturers Association, Washington, elected these officers: President, LeRoy R. Brooks, Tool Steel Gear & Pinion Co., Cincinnati; vice president, E. F. Borisch, Milwaukee Gear Co., Milwaukee; and treasurer, J. L. Buehler, Indiana Gear Works Inc., Indianapolis.

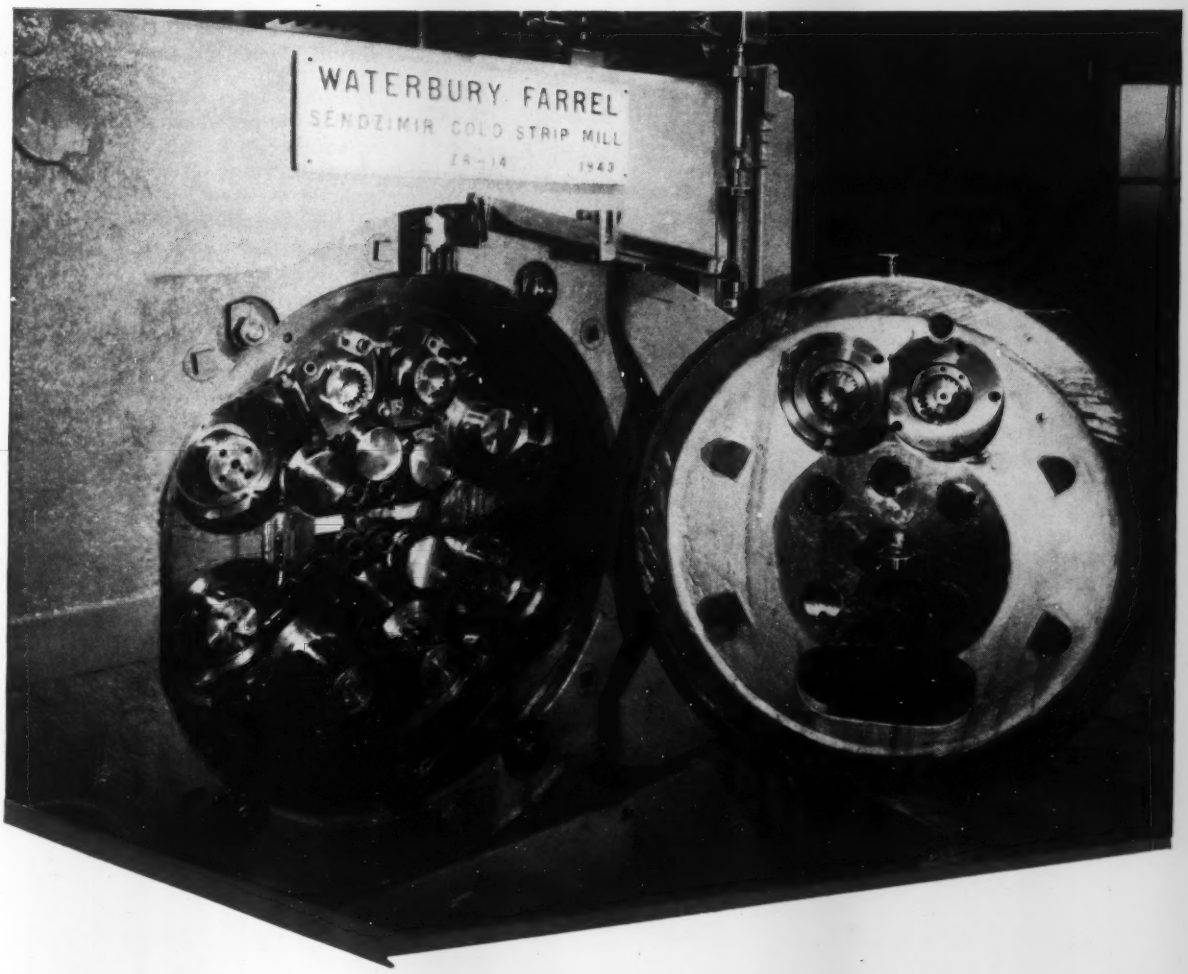
Bradley B. Evans, Empire Steel Castings Inc., Reading, Pa., was elected president of the **National Castings Council,** Penton Bldg., Cleveland. Other officers are: Vice president, H. F. Park Jr., General Steel Castings Corp., Granite City, Ill.; treasurer, F. Ray Fleig, Smith Facing & Supply Co., Cleveland; secretary, Frank G. Steinebach, Penton Publishing Co., Cleveland.

William R. Davies, director of the Audit Division, U.S. Steel Corp., Pittsburgh, was elected president of the **Institute of Internal Auditors,** New York.

Newly elected officers of the **Automotive Engine Rebuilders Associaton,** Indianapolis, are: President, Fred A. Lambert, Lambert Co. Ltd., Los Angeles; first vice president, Leonard Connett, Piston Ring Service Co., New Orleans; second vice president, F. C. Bradley Jr., Connecticut Bearings Co. Inc., New Haven, Conn.; treasurer, C. W. Yount, Eagle Machine Co., Indianapolis.

Glenn H. Friedt Jr., United Platers Inc., has been elected president of the Detroit branch, **American Electroplaters Society,** Newark, N. J.

Machinery Dealers National Association, Washington, elected these officers: President, E. W. Pfeil, Elmer W. Pfeil Inc., Cleveland; first vice president, Charles Kempler, Interstate Machinery Co., Chicago; second vice president, Alex Zeeve, Alex Zeeve & Co., New



Why Bearings, Inc. engineers were asked to solve this bearing problem

FACT—This cold strip mill performs a 70% reduction on light gauge silicon steel. The bearings needed for this job must carry heavy loads. Yet, they must be precise to help insure continuous production of strip without gauge variation from end to end of the coil.

FACT—The plant in which this mill was installed called a Bearings, Inc. engineer who, after a thorough study of the equipment and its uses, recommended the correct replacement bearing for the application. The user knew, from past experience, that Bearings, Inc. engineers had full knowledge of all types of bearings and could recommend the best from the many lines Bearings, Inc. distributes.

FACT—When the O.D. of these bearings become indented by fragments or roll flattened from extended service, we have them ground in shaft sets to within .0002″ section height . . . a further service of Bearings, Inc. and the manufacturer of the bearings.

This is the bearing service and follow through you can expect from Bearings, Inc., your authorized distributor for all nationally known makes of bearings. This is why we are called by our customers for any bearing problem. We'd appreciate the opportunity of helping *you!* Call or write NOW!

Providing bearing service in the territories adjacent to our branches, listed below.

BEARINGS, INC.

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Wheeling
NEW JERSEY: Camden • **MARYLAND:** Baltimore
DELAWARE: Wilmington •
Subsidiaries: Balanrol Corp. • Buffalo, N.Y.• Kentucky Ball and Roller Bearing Co. • Louisville, Ky.

Everything's stacked in your favor with this full-slewing cantilever boom

Full selectivity allows stacking and grouping of dissimilar materials for conservation of yard space.

Photo Courtesy Pacific Tube Company, Los Angeles

Available L.P.G.-, diesel-, or gasoline-electric powered in capacities from 5 to 50 tons. Available on long-term lease arrangement, too. Write for new Coles fact-book, "101 Cost-Cutting Ways".

COLES

CRANES

JOLIET 7, ILLINOIS

York; treasurer, Richard Strom, Strom Machinery Corp., Chicago.

Philip Jones, formerly assistant to the president and corporate secretary of R. M. Hollingshead Corp., Camden, N. J., has been appointed assistant to the president of the **American Management Association**, New York.

VACATIONS

Dayton Rogers Mfg. Co., Minneapolis, will close from July 8 through July 19.

Chase Brass & Copper Co. will close its plants July 1 to July 15. The shutdown applies to the Waterbury mill, Cleveland mills and Waterbury Mfg. Co. plant. Kennecott Wire & Cable Co.'s plant also will be closed. Warehouses and sales offices will remain open.

Garrison Machine Works Inc., Dayton, O., will close its plant and offices for vacation from July 1 until July 15.

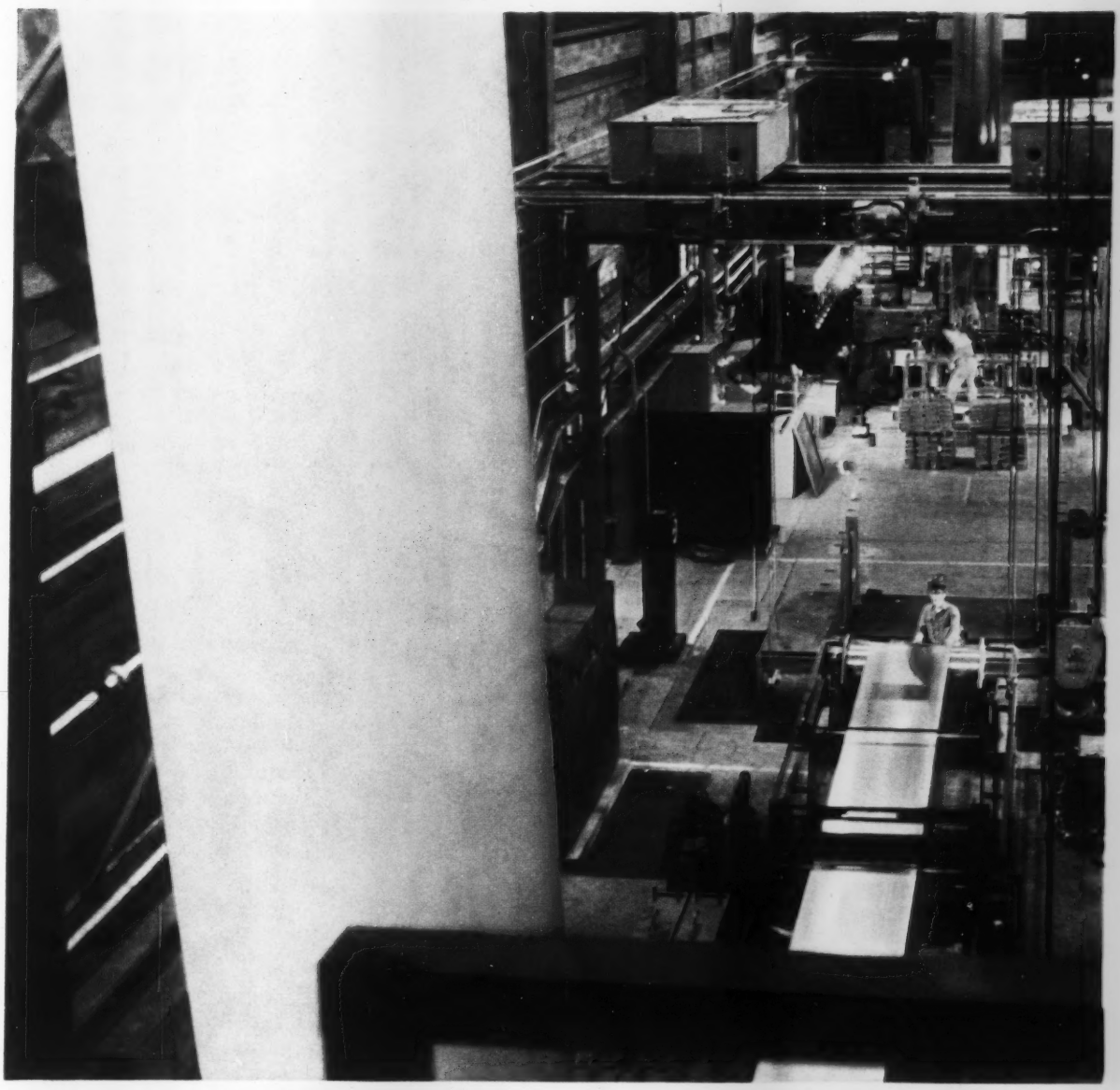
REPRESENTATIVES

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., appointed New England Smelting Works Inc., West Springfield, Mass., as ingot distributor.

Lamson & Sessions Co., Cleveland, appointed Fastening Devices Inc., Brooklyn, N. Y., as national distributor for powder-driven and hand-tool drive pin fasteners. The Cleveland firm makes bolts, nuts, cotters, capscrews and screw machine products.

Benjamin Metals Co., Los Angeles, warehouse distributor for **Harvey Aluminum**, Torrance, Calif., has been appointed distributor of Harvey's new hollow aluminum bar stock.

Wickwire Spencer Steel Division of Colorado Fuel & Iron Corp., appointed Southern Equipment & Tractor Co., Monroe and Shreveport, La., as a distributor of Wickwire rope.



JALZINC is J&L's superior quality zinc coated steel

JalZinc is produced on this modern Sendzimir continuous galvanizing line. JalZinc has a tight, uniform coating that resists cracking and flaking. The uniform ductility, flatness and a high luster surface finish improve your product appearance.

JalZinc is available in a wide range of gages and widths in both cut lengths and coils. It can be furnished in coating weights from 1.00 oz. to 2.50 oz. per sq. ft., depending on your end product needs.

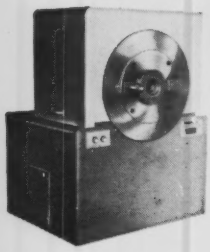
Get details from your local J&L district office or write to the Jones & Laughlin Steel Corporation, Dept. 518, 3 Gateway Center, Pittsburgh 30, Pa. For out of stock requirements, call your local steel warehouse or sheet metal distributor.

JL STEEL

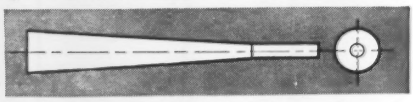
Jones & Laughlin

...a great name in steel

How much are you paying for the machine that isn't there?*



Because a Torrington Rotary Swaging Machine shapes work by reduction instead of cutting metal away, you can often save on both material and time by swaging parts you are now machining.



This part, for example, was formerly turned from brass bar stock. When swaged from tubing, stock weight was reduced 83%, and the work cycle cut from 86 seconds to 12 seconds!

You can put many operations on a Torrington Swager—pointing, tapering, reducing, sizing, forming inside contours and threads. With sizable savings on operations like these, your swaging machine will pay for itself in a short time.

See for yourself what swaging is and what it can do. Let us show you our new, 20-minute, full-color film on swaging. And write for our catalog on Torrington Rotary Swaging Machines.

THE TORRINGTON COMPANY • Swaging Machine Division
150 North Street, Torrington, Conn.

TORRINGTON ROTARY SWAGING MACHINES

STEEL
June 10, 1957

Technical Outlook

ADHESIVE BONDING GROWS — Laminate bonding of metals and nonmetals with adhesives is on the upswing. New applications include: Bonding paper honeycomb cores to aluminum skins in making storm doors; bonding honeycomb and other materials to the outer skin of building panels; bonding plastic laminates to desk tops and tops of dishwasher cabinets.

ALUMINUM-TIN BEARING— The Tin Research Institute, Columbus, O., reports progress in bonding aluminum-tin alloys to steel backing plates without an initial aluminizing of the steel. Experimenters have found that if the alloy is first rolled to a hardness equal to that of the steel, both alloy and backing will deform equally during bonding. The process works at temperatures under 390°F; annealing at 660°F increases the strength of the bond.

MOLY IN AIR— Looking for a heating element with the high temperature oxidation resistance of platinum but which costs less? Fansteel Metallurgical Corp., North Chicago, Ill., makes a molybdenum disilicide heating element that can be operated at 3000°F in air, reducing or neutral atmosphere. A self-healing silicide coating keeps the molybdenum from oxidizing.

HIGH TEMPERATURE SOLDER— A new, high zinc solder (95 per cent zinc, 5 aluminum) will join all aluminum alloys and can be used to join aluminum with other metals. Because it melts at 715 to 725°F, it can reduce joining costs by making high temperature joints that have had to be brazed or welded. A flux for use with the solder also has been developed by the manufacturer, Aluminum Co. of America, Pittsburgh.

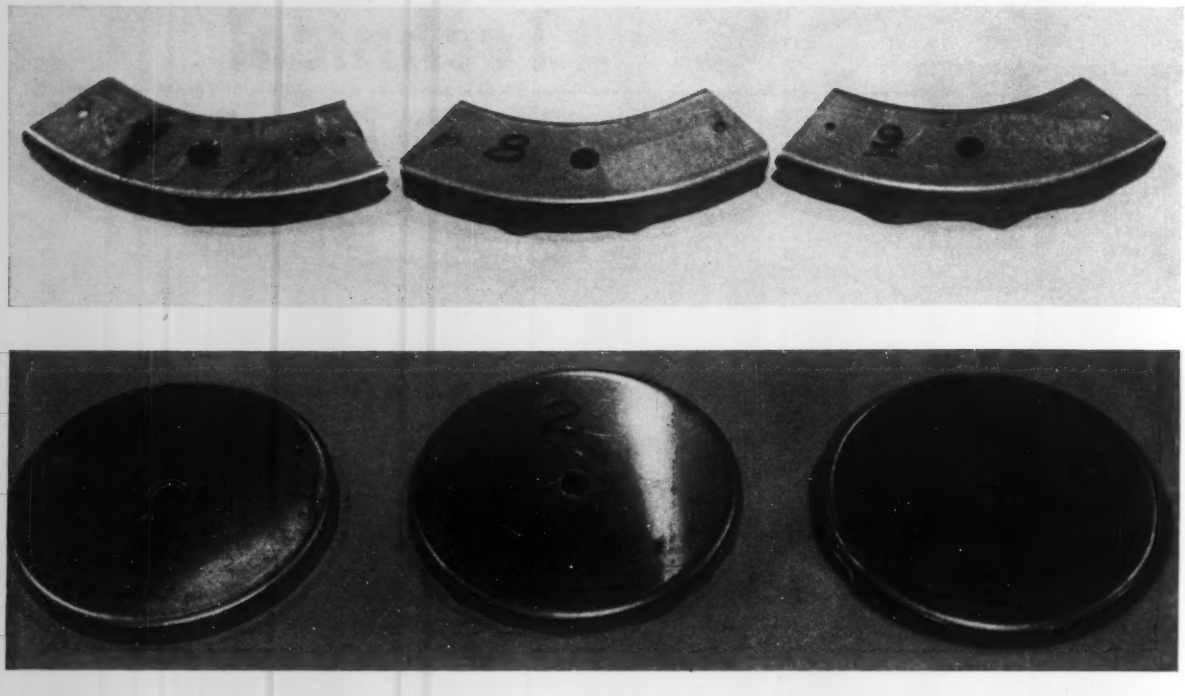
X-RAYING MINIATURES— When you have to x-ray an electronic part that's only 0.25 in. long, the radiograph is difficult to read. But if you make a 10-diameter photographic enlargement, you get a 2.5 in. radiograph that yields useful information. That's what Battelle Memorial Institute, Columbus, O., does to check the cause of failures.

CASTING GROWTH— Eaton Mfg. Co., Cleveland, is designing a permanent mold machine for its Vassar, Mich., gray iron foundry that will make 40-lb castings. Present limit is 25 lb. Casting facilities are being expanded from 29,000 to 40,000 tons a year.

SPUN TO DESTRUCTION— Scientists at Aluminum Co. of America, Cleveland, are spinning cast, forged and brazed aluminum parts to destruction at peripheral velocities of 2000 mph. Purpose: To test new alloys for high-speed rotating applications.

ALL-POSITION CO_2 WELDING— General Electric says its Fillerarc semiautomatic system now handles vertical and overhead welds. Mainly for mild steel, the equipment uses a reactor to control current peaks. It handles thicknesses from 1/16 to several inches with wire as small as 0.035 in.

Metalworking Outlook—p. 93 *Market Outlook—p. 243*



Here's how parts made at Convair by high velocity forming (left) stack up against those made in a Hydropress and by trapped rubber in a drop hammer. Discs are 2024-0 aluminum, 0.064 in. thick; channels are annealed stainless steel, 0.051 in. thick. Note absence of wrinkles in the velocity formed pieces

Forming with a Bang

High velocity techniques are being used to form supertough metals like fully hard, Type 302 stainless. One firm says it is forming flanges which are free of waves and buckles

GASES expanding at 4 miles a second drive a projectile through the barrel of a standard M-1 rifle at 3200 ft per second. Something's got to give if the gases collide with an immovable object.

Engineers are using the principle to work metals so tough they can't be handled any other way. Explosives like gunpowder and detonating compounds supply the energy.

They're using three approaches to high velocity metalworking:

1. Shaped charges which form the metal with half a die or none at all.
2. Gases from cartridges which force a piston or punch through the metal.
3. High pressure gases which drive opposed rams. Convair's experimental Hyge (high gee) is an example. It can deliver a 300,000 psi wallop (see illustration, right).

Breakthrough—Results are encouraging, to say the least. Traditional rules of metal behavior already are taking a beating.

Lockheed Aircraft Corp., Burbank, Calif., reports: 1. The elongation of fully hard, Type 302 stainless is doubled by high velocity forming. 2. The elongation of one type of aluminum is increased 600 per cent. (The firm is able to double the diameter of a seamless tube.) 3. The flanges of parts formed by this method are free of waves and buckles (see illustration above).

Support — Major aircraft firms are pushing the revolutionary method. The Air Force has selected a development firm and is negotiating a substantial contract.

Gee Whiz Forming . . .

	(Typical forming speeds)
Drawing presses	30 to 150 ft per minute
Drop hammers and impact forgers	to 26 ft per second
High velocity forming	4 miles per second

E. I. du Pont de Nemours Inc. and Olin Mathieson Chemical Corp. are making exciting contributions.

Experts say you can expect these benefits in the near future:

1. Forming presses will be much smaller than present types.

2. Tools will last 10 to 20 times longer than those used in conventional methods.

3. Deep drawn parts will be formed at high speed.

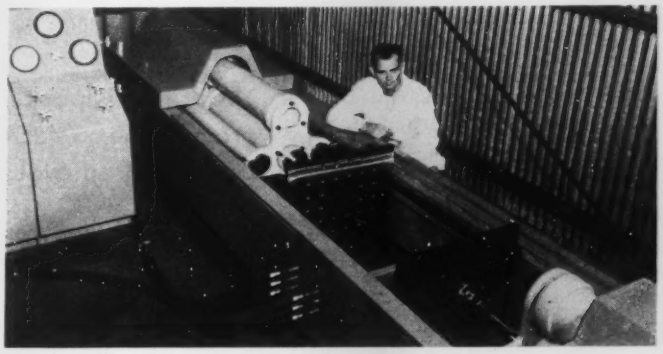
4. Powder or cartridge actuated tools will replace a substantial portion of the portable tools now in use. The move will nearly eliminate the need for air hoses and extension cords.

Possibilities—According to Lockheed, explosive forming doesn't need to make any more noise than a rifle equipped with a silencer. Researchers report that the process isn't a bit more dangerous than many accepted methods of fabrication now used.

Burt C. Monesmith, vice president, Lockheed, thinks there are great possibilities in the development of the shaped (directional) charge—an art long practiced by ballistic and oil industry experts.

Apparently Du Pont agrees. It is also concentrating on detonating compounds. (They expand much more rapidly than gunpowders and create considerably more shock per unit of weight.)

This example suggests the im-



Convair Tries Machine Approach

By W. C. DALLMAN
Tool Development Analyst
Convair, a division of General Dynamics Corp.
San Diego, Calif.

THE machine above is a high velocity impact press. Called the Hyge, it's one of Convair's approaches to high velocity forming.

Recent trends in aircraft missiles call for higher strength materials and increasingly intricate parts. Such demands are taxing the capacity of present machinery to the limit.

The first attempt to solve the problem was the Guerin (rubber pad) process applied to drop hammers. Although it produced impact pressures above 10,000 psi, Convair was looking for much higher pressures and greatly accelerated ram action.

The Hyge promises to be the answer. It is pneumatically operated with dry nitrogen at 1200 psi. Two cylinders simultaneously force steel heads toward each other. Impact forces exceed 1 million inch pounds. Closing velocity is more than 200 ft per second.

A die is mounted on one head and a rubber pad on the other. The impact force is completely absorbed by the part being formed.

Lockheed's approach is with cartridge charges. This press uses a shotgun shell to expand a 1 in., 2024 aluminum tube to 2 in.

Here's Convair's experimental press for explosive forming. Charge is placed in top of press which is lowered

plications of Du Pont's efforts: It embosses its trademark on a flat sheet by applying a shaped charge. No die is used.

A cable eye is another example. The cable is looped to form the eye. To hold the loose end, a tube or collar is slipped over the doubled cable. An explosive charge is wrapped around the tube and detonated. When the cable and collar are sawed apart, it is almost impossible to locate the joint.

Opposed Rams — Like Convair, some firms are taking the mechanical approach. The blank is placed between opposed rams. One holds a die and the other a rubber pad. The rams are released simultaneously and travel an equal distance before impact.

With its Ramset tool, Winchester-Western Division, Olin Mathieson Chemical Corp., Cleveland, has pierced and punched its way through many supertough metals, some of them with tensile strengths in the 300,000 psi range.

Such metals crack when bent. High speed and carbide drills hardly touch their surfaces, a fact which has prompted the remark: "It's not how many holes per drill, but how many drills per hole."

Experiments with the Ramset show that regardless of the metal such holes are superior to those drilled or punched. Punches can be designed for piercing holes for self-tapping screws. There are no surface stresses, cracks or burrs.

Douglas Aircraft Co., Santa Monica, Calif., is seriously considering a modified Ramset tool for punching rivet holes. The punch may be shaped to coin a depression around each hole. It's insurance against stress cracks that sometimes develop.

Outlook—This will give an idea of the potential of the process: One of the Big Three auto producers stores 52 types of auto doors. The only difference between one type and another is the hole pattern for hinges, handles and trim. The firm is studying the possibility of storing the doors blank and piercing them as required with a cartridge-actuated tool. One requirement is that the piercing be done without dimpling or a backing tool.

Standards for Machinability

They're an important phase of ASTE's research program. Other objectives are a metal cutting bibliography and an evaluation of all published literature

"EVERY YEAR, about 15 million tons of metal are whittled into chips at a cost of more than $10 million. If improvement in machining methods should save only 10 per cent of that cost, it would add more than $1 billion to our economy."

The statement, made by Hans Ernst, director of research, Cincinnati Milling Machine Co., Cincinnati, demonstrates the importance of metal cutting research to the metalworking industry and the impetus behind the long range research project sponsored by the American Society of Tool Engineers.

Purpose—The ASTE program has been set up to determine whether a better understanding of metal cutting can be developed. Proved principles of the process would result in better machine tools and cutting tool materials, in cheaper methods for machining metals and, ultimately, in reduced prices to the consumer.

The project is divided into three stages: 1. Compile a metal cutting bibliography with abstracts of all information published since 1943. 2. Summarize and evaluate knowledge on metal cutting and indicate subjects requiring additional effort. 3. Establish standard machinability test procedures.

Stage 1—The initial stage of the project, which was assigned to the John Crerar Library, Chicago, is nearly complete. Some 30 indexing services turned up over 10,000 items on metal cutting. Of these, about 6000 were selected for abstracting.

The bibliography will be made into a book with references grouped by the cutting process and subdivided according to theory, experimental studies, shop practice and general information.

Stage 2—Battelle Memorial Institute, Columbus, O., has the job of evaluating and outlining all theories of metal cutting. Preliminary drafts have been reviewed. Dr. F. W. Boulger, chief of the ferrous metallurgy division, offers these tentative conclusions:

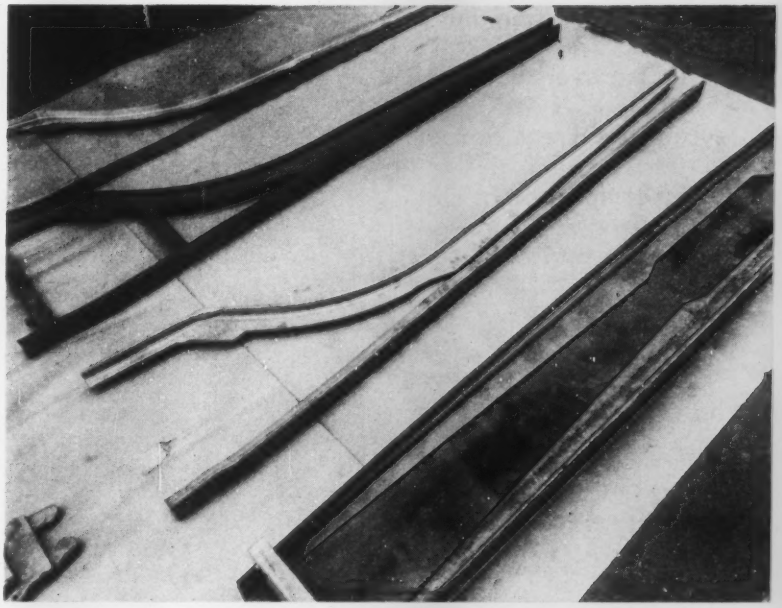
Many procedures used for evaluating machinability give comparable ratings. Machinability ratings based on tool forces, tool-chip temperatures, tool wear or tool life are in quantitative agreement. Data from many sources indicate that only a 10 degree variance exists in the relationship predicted by the two most useful theories of force relationships in metal cutting.

Stage 3—This stage has just been initiated and is expected to reach completion in 1960. The over-all program is expected to require a minimum of five years.

Col. L. S. Fletcher, ASTE research fund director, says: "We feel that establishing standard machinability test procedures is not only a distinct possibility but a necessity," adding:

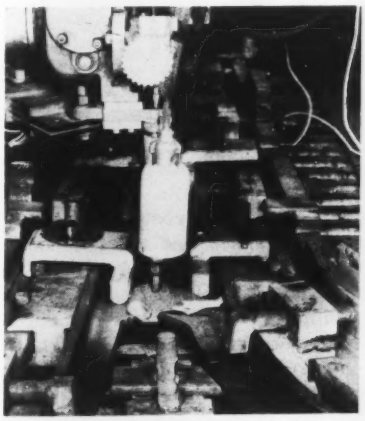
"Industry uses many diverse methods in making tests for machinability—each producing different results and conclusions. Seldom can even two organizations agree on interpretation of their results."

Components are made by joining several small forgings and plate stock. They replace single, large forgings and are easier and cheaper to make. Here is how they are produced by a California firm



Here are the steps in making a flap track. I-beam is cut into upper and lower sections. Sections are formed and welded. Struts prevent distortion. Final part has been machined

Weldment Cuts Airplane Costs



This fixture holds parts firmly to prevent distortion during welding. Automatic, submerged arc produces sound welds. Tracks are distorted less than 1/32-in.

THE flap track shown above is used on one of our most advanced bombers.

It is an example of how a weldment made from high strength steel parts can replace a single large forging. Unlike forgings, preformed weldments don't have to be machined extensively on duplicating equipment or special machine tools.

Maker—The tracks are made by Rohr Aircraft Corp., Chula Vista, Calif. The firm developed the tooling, welding techniques and heat treating needed to make parts to close tolerances.

The parts are made from AMS 6428, a nickel-chromium-molybdenum-vanadium steel. Heat treated, its tensile strength is 180,000 psi.

Procedure—Rohr obtains the steel in I-beam form. Parts of the tracks are cut by oxyacetylene torches. Sections are hot formed and welded automatically in a jig which holds parts to contour. Variations are less than 1/32-in.

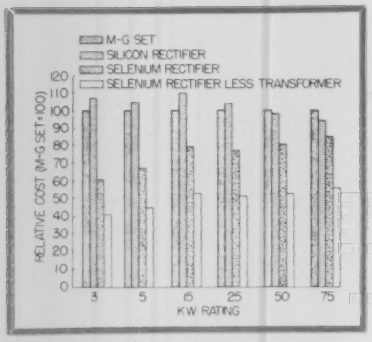
After welding, the tracks are heat treated by austenitizing in a neutral salt, marquenched in molten salt, oil quenched and rinsed in hot water. The final step is a draw in a tempering oven.

Rohr uses an exceptionally large salt bath: 4 x 4 x 16 ft deep. It holds 17½-tons of molten salt at 1600°F. Methyl chloride is added to rectify the salt and control decarburization.

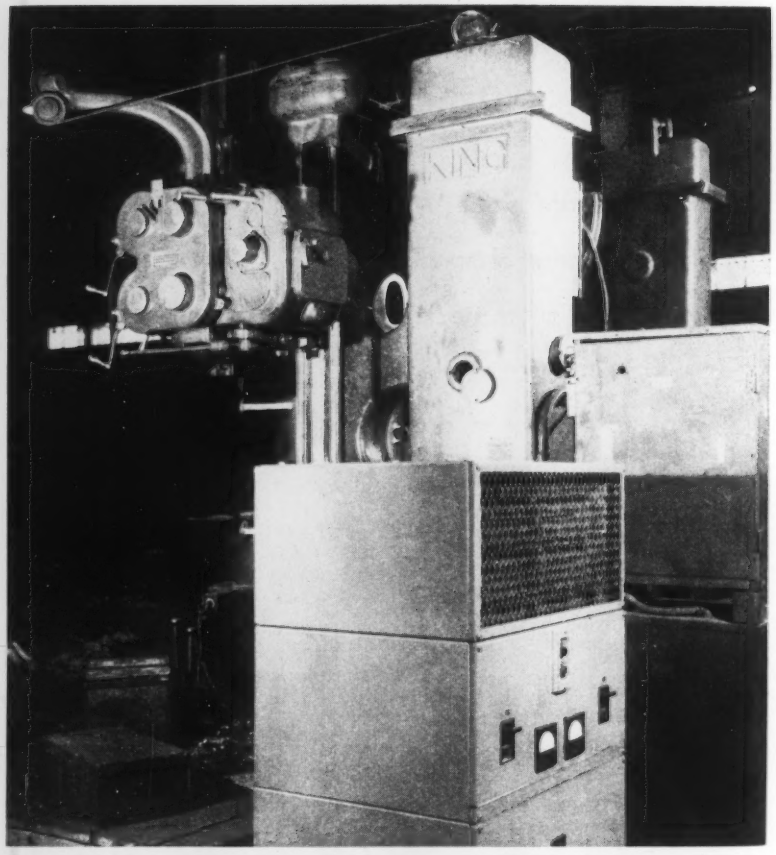
As a part of final inspection, weldments are completely x-rayed and checked by magnetic particle inspection.

Rohr also conducts research and fatigue testing programs to raise allowable stress levels in welds.

The conversion unit is taking over the job of supplying direct current. Here is a comparison of cost, maintenance and operation of motor-generator sets and rectifiers



Relative first costs of motor-generator sets, selenium and silicon units



This 50-kw, 250-volt silicon rectifier unit supplies direct current to a boring mill. The need was for adjustable speed, constant horsepower

Power Sources for Machine Tools

ADJUSTABLE speed requirements of machine tool drives are focusing attention on the direct current motor and power source. When close control is necessary, such a motor is essential.

The trend in power sources is to "on-the-spot" conversion units. The direct current distribution system is practically obsolete; alternating current systems deliver power efficiently to practically any area.

Conversion Units — Motor-generator sets or rectifiers such as the selenium, silicon and germanium units will do the job. For medium voltages, any of the rectifiers can be used. Silicon is preferred over germanium because of its high inverse voltage rating and ability to operate at higher temperatures.

Considerations—In selecting a direct current power supply for machine tools, seven factors should be considered, E. J. Laughlin, manager of metallic rectifier sales, Westinghouse Electric Corp., Buffalo, told the 21st Annual Machine Tool Electrification Forum.

They are: Application, original cost, installation cost, maintenance expense, space and weight, quietness of operation and efficiency, and light load losses.

Application—The type of speed control required often dictates the choice of power supply. If it is of the constant torque, variable voltage type, the motor-generator set is predominantly used. But if the application requires constant horsepower and speed control by adjustment of the motor shunt field, a selenium or silicon rectifier is likely to be the answer.

Where overhauling loads occur

(as in elevator equipment or where high inertia loads are connected to a direct current motor), dynamic braking control is available to work with the static rectifier to absorb this regenerated power. It cannot flow back through the rectifier.

Cost—The cost of selenium rectifiers is 66 to 86 per cent that of corresponding motor - generator sets. Rectifiers are purchased as packaged units that require no external control. Optional items, such as instruments, hand-operated breakers and indicating lights can be added to the package.

A new unit introduced into this line-up costs less than half the price of motor-generator sets in most sizes. It is a selenium rectifier designed to operate directly from a 208/120 volt, 3 phase, 60 cycle network without a transformer.

Output is about 255 volts, two-wire. Although these units are not likely to be widely applicable because there is no way to adjust the direct current output, they do represent a low-cost means of power conversion where 208 volt alternating current is available.

Silicon rectifiers cost more than the selenium type. This is due mainly to the added protection that designers feel is necessary with direct current motor loads.

Installation—Of all types of power conversion equipment, the packaged rectifier is the least expensive to install. It requires no foundation; it doesn't have to be bolted down; there is no leveling or lining up to be done; it is easy to move with a fork lift truck.

Each power unit is set for its rated voltage at time of manufacture. Installation consists of connecting alternating current leads to the rectifier and direct current leads to the load. If the alternating current supply voltage is higher or lower than the nameplate rating, taps are available for setting the direct current output at the required value.

Maintenance — Motor-generator sets usually require the most attention and static rectifiers the least. A rectifier installed in a reasonably clean atmosphere will operate several years without maintenance.

When the atmosphere contains dust and dirt, it is well to clean the unit regularly with an air hose. Filters can be used to keep out much dirt, but they often become clogged and restrict air flow.

Internal fan arrangement for a 100-kw rectifier unit. Replacing one large fan with three lowers noise level

Floor Space—Comparing a 50-kw rectifier unit with an equivalent motor-generator set, the rectifier occupies a 25 x 31 in. space, or less than 5½-sq ft. The motor-generator set takes up almost three times as much space.

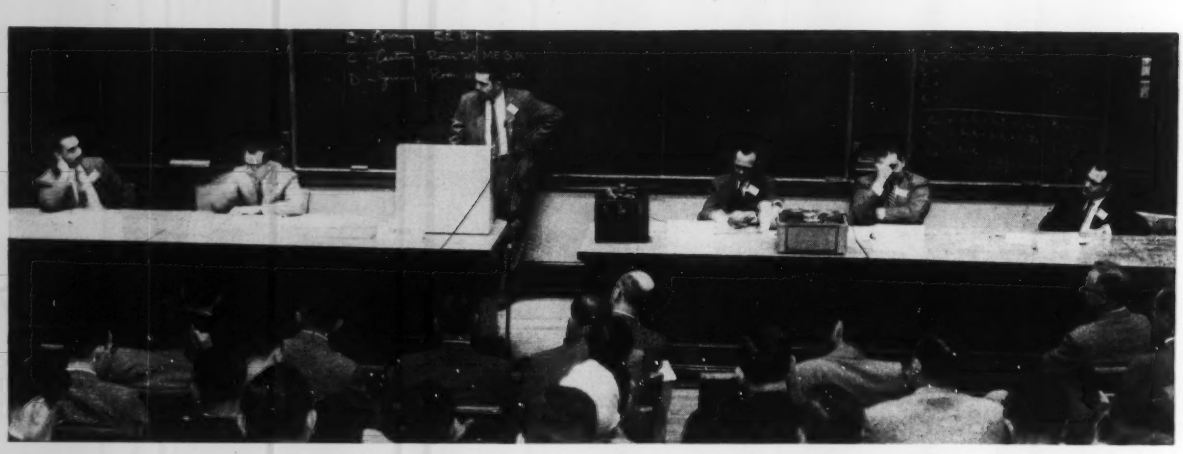
The same comparison can be made for the net weight of each. This is important for rectifiers because they are often mounted in an out of the way spot, such as a shelf or a mezzanine floor. A 50-kw rectifier weighs about 1600 lb, an equivalent motor-generator set about 2700 lb.

Quiet—Noise levels in most factories are high. Any measure that can reduce them is welcome. A typical 100-kw rectifier unit uses three small fans rather than one large one. This reduces noise and improves reliability.

Fans are mounted inside, with the blades away from any screened openings. Air is brought in at the front of the unit where it is reasonably free from dirt and dust.

Efficiency—The silicon unit installed on the boring mill in the photo (page 146) has a full load efficiency of 90 per cent. At half load, efficiency is about 92 per cent and remains high down to about one-quarter load.

Light load efficiency of rectifiers is important: In a normal day, a power supply operates frequently at no load or light loads. Rectifier no-load losses are normally less than half those of rotating equipment.



Panelists (left to right): Karl Scheucher, Thompson Products Co., Cleveland; J. W. Wilson, Cincinnati Milling Machine Co., Cincinnati; Moderator Harry Mergler, Case Institute of Technology; W. Yogus, Valeron Corp., Modco Division, Detroit; Lee Ording, Ford Motor Co., Aircraft Division, Chicago; Sterling Winchell, Warner & Swasey Co., Cleveland

Experts Define Future of Tape Control

They see its use on both large and small machines. Prices are expected to be competitive. Tool engineers are warned to look for complete revisions in machine design

A SYMPOSIUM at Cleveland's Case Institute of Technology agreed that any plant with short production runs is a logical target for numerically controlled machine tools.

Panelists (three representatives of potential users and two machine tool builders) think the cost of the method will become sufficiently competitive to permit even the smallest shops to take advantage of it.

Advantages

The prospective users believe they will gain flexibility, consistency and reliability. Here are excerpts from their comments:

Mr. Scheucher (Thompson Products): "We're trying to meet tightening requirements of quality, delivery and price. Numerically controlled equipment is one of the finest tools . . . to help us meet those ends. Also, on some parts the material cost is the major portion of selling price. The jeopardy factor is high, and we are looking forward to achieving a higher degree of reliability and reproducibility."

Mr. Ording (Ford's Aircraft Division): "We need to do as many operations as we can in one setup. Numerical control will help us reach this objective. It will give us more flexibility. We don't need it for greater accuracy, but it must give us more consistent accuracy."

Mr. Yogus (Valeron Corp.): "Accurately preset speeds and feeds will help us develop tooling suited for specific requirements. At present, cutting tools are limiting factors on many production machining jobs."

What's Coming?

Two comments by the builder representatives hint of developments beyond anything we've seen so far:

Mr. Winchell (Warner & Swasey): "Many things are on hand-controlled machines simply because they're hand controlled. With the advent of numerical controls, we look for a complete revision in machine tool design."

Mr. Wilson (Cincinnati Milling): "Some of the numerical control systems will lend themselves to a setup where one control maneuvers a group of machine tools."

Another tip: Controls will have their own monitoring and checking circuits to simplify the electronic maintenance problem.

Personnel

Two users commented on personnel requirements.

Mr. Ording: "The programmer will need skills of the operator, process engineer and the tool engineer."

Mr. Scheucher: "Rather than use lower skills for machine operation, we're looking for a higher yield from the skills we now have."

The consensus: Both engineering and operating personnel will have to be trained for the new controls.

US RUBBER V-Belts

He got new Calm and Reassurance for only 77 cents

Now and then we get human interest reports on the success of our products. These reports are often called "the small incident." We prefer to think of each as one of many success stories—happening every day.

This particular story concerns a man, an iron lung and 77¢. It happened just like this:

For months this man listened to the vibrating sounds of one V-belt after another, slipping, flapping and wearing. In the silence of a hospital room... in the helplessness of an iron lung... these sounds took on terrifying significance. The man knew only that should the belt fail, the respirator would fail, too.

Then, a U. S. V-Belt was installed—cost: 77¢.

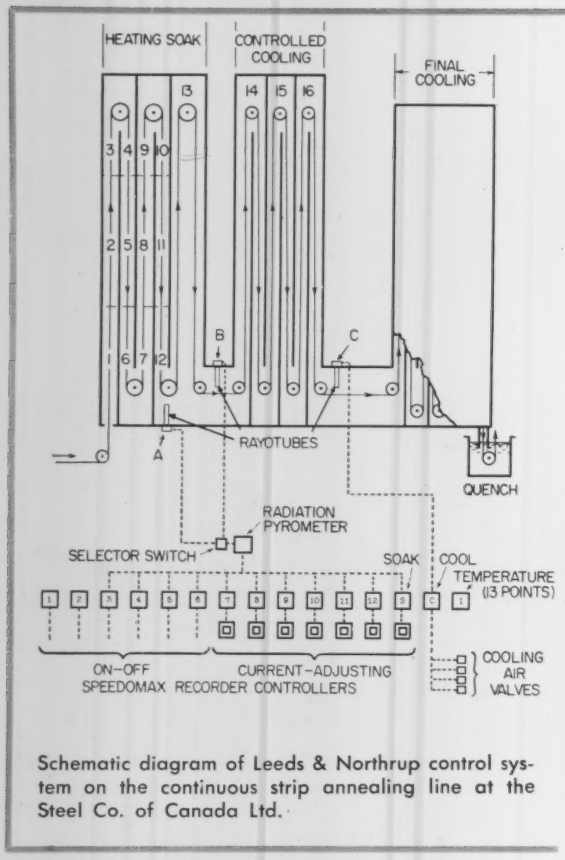
From that day, the patient has had new calm and reassurance. The motor hums steadily, the belt performs perfectly, with no sign of wear, no *sound* of flapping.

Just "a small incident" involving only 77¢—but it gives us a pretty good feeling about the quality of material and workmanship that goes into U. S. V-Belts (built with electronic controls and new molding methods) and every "U. S." product.

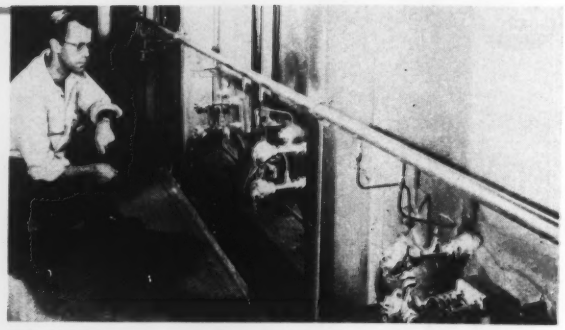
U. S. V-Belts are obtainable at any of our 28 District Sales Offices, at selected "U. S." distributors, or by contacting us at Rockefeller Center, New York 20, N. Y.

US RUBBER **Mechanical Goods Division**

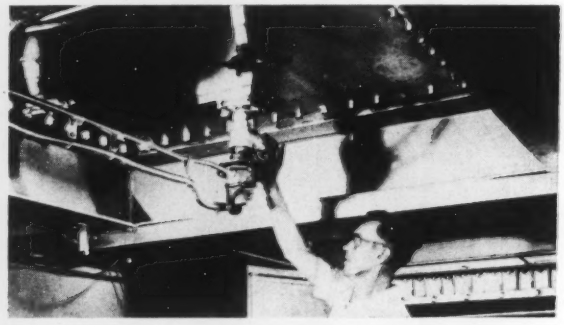
United States Rubber



Schematic diagram of Leeds & Northrup control system on the continuous strip annealing line at the Steel Co. of Canada Ltd.



Thermocouples installed through the side wall of the annealing furnace for measuring zone temperatures are protected by compressed air



Rayotube sighting up through the furnace bottom to measure temperature of strip as it leaves the last heating zone

Cascade Control for Strip Annealing

Instrument system on continuous strip annealing line of Canadian mill monitors temperature and makes corrections for variables in dimensions and speed

IN CONTINUOUS annealing of strip for tin plate, the Steel Co. of Canada Ltd., Hamilton, Ont., encounters frequent load changes due to variations in the strip's speed, width and thickness. To hold annealing temperature precisely under load changes, the company uses an interlocked instrument combination called "cascade control."

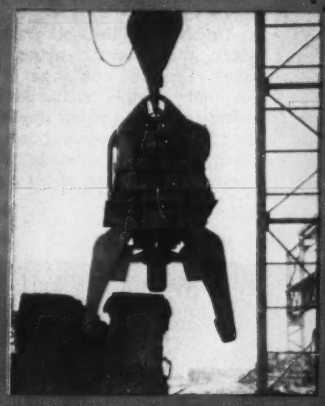
Part of a complete temperature control system designed by Leeds & Northrup Co., it uses a radiation pyrometer to rapidly detect effects of load changes. It resets individual zone controllers, maintaining temperature control within narrow tolerances on a completely automatic basis.

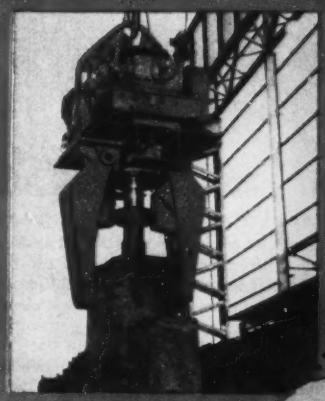
System—The complete system is shown schematically above. In addition to cascade control of zone heat inputs, it measures and controls exit strip temperature from the controlled cooling zone. The company believes its flexibility in maintaining quality tonnage production in spite of operating variables justifies the instrumentation. It keeps heating costs low and production rates on annealing high.

The electrically heated furnace, designed and constructed by the Drever Co., has an installed input of 3000 kw. Running at 550 fpm, its rated production of 32 gage strip (33 in. wide) is 37,000 lb per hour. It normally handles 35 to 25 gage strip 19 to 38 in. wide. The furnace is provided with a protective atmosphere to assure clean strip which does not require pickling before tin plating.

Heating Zone—The strip travels up and down a distance of some 42 ft through 12 individually controlled heating zones. This is followed by a soak zone, a controlled cooling zone, an uncontrolled cooling zone and a quench. For the heating and soak zones, strip chart Speedomax recorder-control-

450 TON
portable ingot stripper
in action





Our newly designed 450 ton Portable Ingot Stripper may be used every day of the year or on a stand-by basis.

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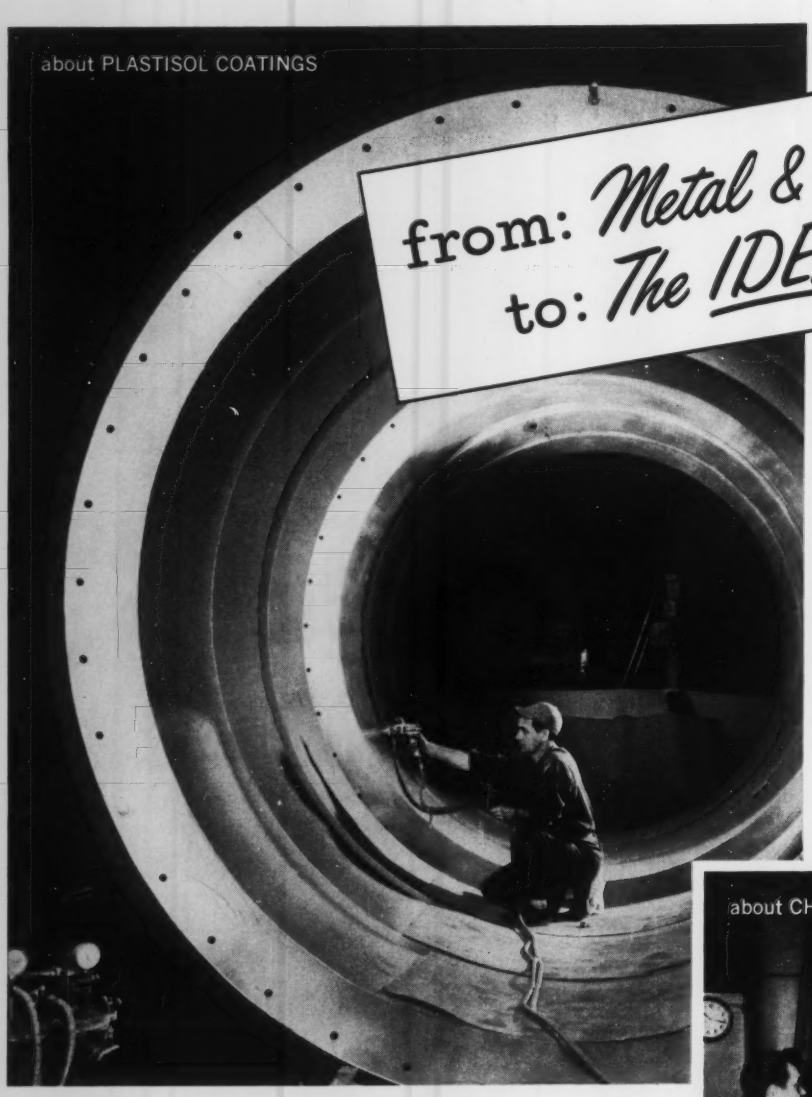
PLANT AT GLASSPORT, PENNSYLVANIA

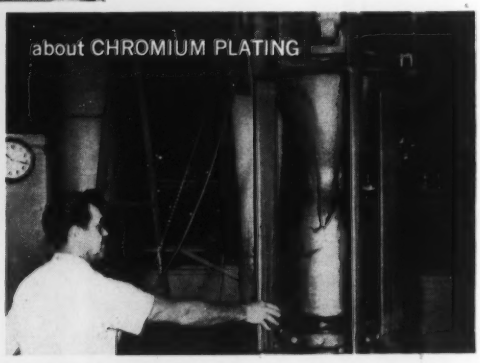


from: Metal & Thermit to: The IDEA Minded

How to make ordinary metals last longer

These large metal rings, being sprayed with a sheet-like coating of Unichrome Plastisol, will have extraordinary protection not only against corrosion but also *abrasion*. Past reports show that life of equipment subject to abrasion has been increased as much as twelve times with plastisol protection.

Unichrome Plastisols produce heavy-duty, thick, impact-absorbing, chemical resistant coatings. They make ordinary metals fit for severe service conditions. Suggested applications: As a "cushioning" coating for conveyors; also tank linings which cost less and prove better than sheet materials.



High speed plating for high speed engines

One producer plates combustion chambers of rocket engines with chromium to gain its high melting point and corrosion resistance. The Unichrome SRHS® Chromium Plating Bath which was installed reduced plating time by 6 hours per engine. Furthermore, the leveling action of the bath smooths out the small imperfections in the surface being plated, producing a finer finish. Note: The SRHS Bath is also self regulating, giving more *foolproof* operation.

Well welded . . . world's largest coal trailer

Built by Marion Metal Products Co. to carry 95 cubic yards of coal, the largest bottom-dump hopper trailer weighs more than 119 tons. This specially engineered trailer was welded with Metal & Thermit "Murex" electrodes. These electrodes again demonstrated that they develop welds with good impact qualities, handle easily, deposit fast at high currents for economy in fabrication.

PLATING MATERIALS
ORGANIC COATINGS
TIN & TIN CHEMICALS
CERAMIC MATERIALS
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP

METAL & THERMIT
CORPORATION
GENERAL OFFICES: RAHWAY, NEW JERSEY
Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit—United Chromium of Canada, Limited, Rexdale, Ont.

ANNEALING CONTROL . . .

lers measure the zone temperatures with Chromel-Alumel thermocouples installed through the furnace walls (top photo, page 150). These regulate current input to zone heating elements.

On-off controllers are used for the first six zones. They are not reset by the master radiation pyrometer. The controllers for the remaining furnace zones regulate the temperature through saturable core reactors (L&N's "Cat," for current - adjusting proportioning with automatic reset and rate action).

Cascade Control — As sketched (page 150), a radiation detecting element (Rayotube A) sights directly on the strip as it leaves the last heating zone. It's sighted through the furnace bottom (lower photo, page 150), measuring actual temperature of the moving strip. A second Rayotube (B) measures the strip temperature as it leaves the soak zone. Under normal operation, both temperatures should be identical and only one detector is used, through a selector switch, to reset the zone controllers. The operator can occasionally switch to the unused detector for a check of temperature at the alternate point.

A Speedomax recorder-controller logs the strip temperature and electrically adjusts the set points of heating zone controllers 3 through 12, and also the soak zone temperature controller. If, for example, the strip temperature starts to drop below its set point (possibly because of an increase in rate of strip travel), the master controller automatically starts to raise the set points of individual zone controllers. This increases the heat input to balance the greater load and quickly brings the exit strip temperature back to its set point.

Balance — Relative changes of the motorized set points on each zone controller are individually adjusted so that each responds to the master controller's command by the desired amounts. Thus, the control system automatically balances load changes as they occur.

A third Rayotube (C) sights on the strip as it leaves the controlled cooling zone. This temperature measurement is also logged by a

(*Please turn to page* 156)

STEEL WAREHOUSE "TAKES TO THE AIR"

Fig. 1 — TRAK-RAK fork lift at top of column, lifting bundle of steel rod. Unit serves 3 long aisles of racks.

TRAK-RAK SYSTEM INCREASES STORAGE SPACE, SAVES 22% CAPITAL BUILDING INVESTMENT

When A. C. Leslie & Co. Limited, needed more storage area in its busy Toronto steel warehouse, it decided to "reach for the ceiling" with a Chicago Tramrail TRAK-RAK System of vertical storage and handling. As a result, the company estimates it not only saved 22% of projected capital building costs, but increased the overall efficiency and speed of the Toronto operation. The company expects to gain further economies as the TRAK-RAK system is used to its full extent.

A 5 ton capacity toprunning TRAK-RAK Crane was installed in each of two 40 ft. wide bays to serve specially designed 18 ft. high material storage racks (Fig. 1). Each crane bridge has an overhead trolley, from which is suspended an electrically operated rotating column

Fig. 2 — Carriage equipped with 2 pairs of forks. Operator is flopping outer forks up.

equipped with a special fork lift. All operations of the fork lift, which revolves to serve either side of the aisles, moves toward or away from the racks, and raises or lowers on the column, are controlled by the operator who rides with the carriage.

Two pairs of forks are mounted on the carriage. The outer forks may be flopped back (Fig. 2) leaving the inside forks in position for handling palletized or crated material. For handling long boxes, bars, etc., the outside forks are flipped back into working position.

A TRAK-RAK feature which added to handling speed and insured safe operation was the safety interlock switch system which prevents the column from running

Fig. 3 — TRAK-RAK column requires minimum aisle space for operation.

into a rack and permits full rotation only when the unit is safely beyond the end of the racks.

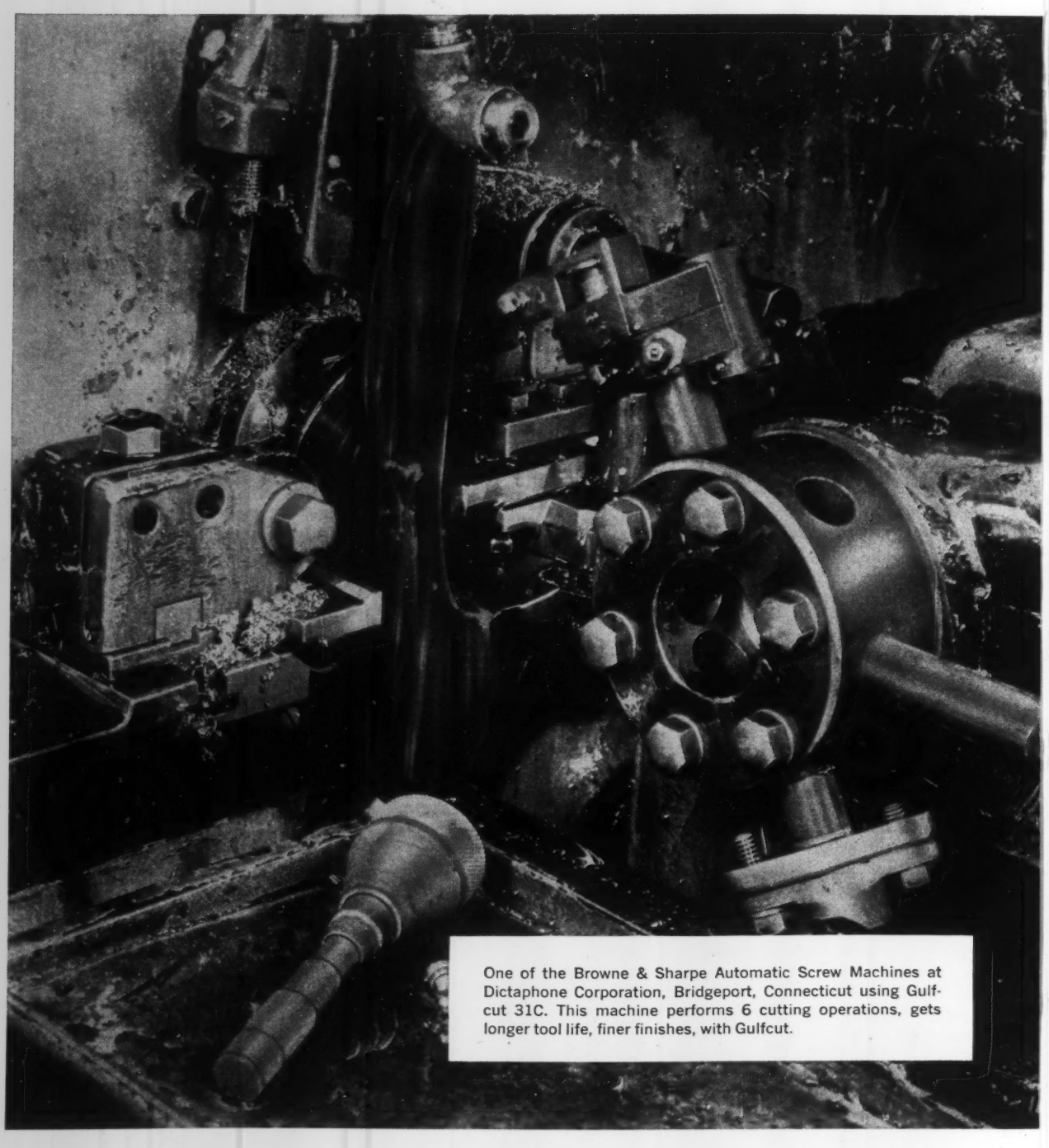
The A. C. Leslie Company reports that a similar TRAK-RAK System installed in its Montreal warehouse permitted a 37% savings in capital building investment with equally good operating efficiency and economy.

For complete details on the TRAK-RAK System of vertical storage and handling, write the manufacturer:

CHICAGO TRAMRAIL CORPORATION
1326 S. Kostner Avenue • Chicago 23, Ill.

At Dictaphone Corporation, Bridgeport, Connecticut...

Closer tolerances, better



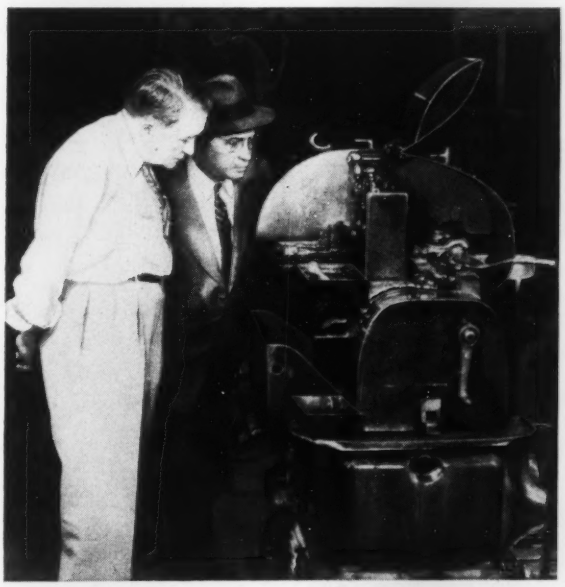
One of the Browne & Sharpe Automatic Screw Machines at Dictaphone Corporation, Bridgeport, Connecticut using Gulfcut 31C. This machine performs 6 cutting operations, gets longer tool life, finer finishes, with Gulfcut.

finishes, fewer rejects ...with GULFCUT!

Dictaphone has used Gulfcut 31C since Gulf first introduced this cutting oil—has used it exclusively for the past 10 years. On brass, bronze, aluminum, or any of the several types of steel used in manufacturing precision parts for Dictaphone Machines . . . *one* cutting oil, Gulfcut, does the job!

Says Joseph A. Maloney, Process Engineer: "Day in, day out, our machines are producing fine quality work, using Gulfcut. We get steady production at an even rate—hold tolerances as close as 3 ten thousandths. Gulfcut 31C provides the necessary combination of lubrication and cooling that leads to longer tool life, better finishes, with fewer rejects."

Whether you need a mineral-lard oil, a sulfurized-mineral oil, a sulfurized-mineral-lard oil, a sulfo-chlorinated-lard oil, or an emulsifying oil (the Gulfcut line includes all of these) . . . call your Gulf Sales Engineer. He will be glad to recommend the proper cutting oils for *your specific needs.*



Joseph A. Maloney, Process Engineer at Dictaphone, and J. A. Magill, Gulf Sales Engineer, observing Gulfcut 31C at work on precision parts. Gulfcut cutting oils excel over a wide range of cutting applications . . . help to reduce machining costs.

GULF OIL CORPORATION

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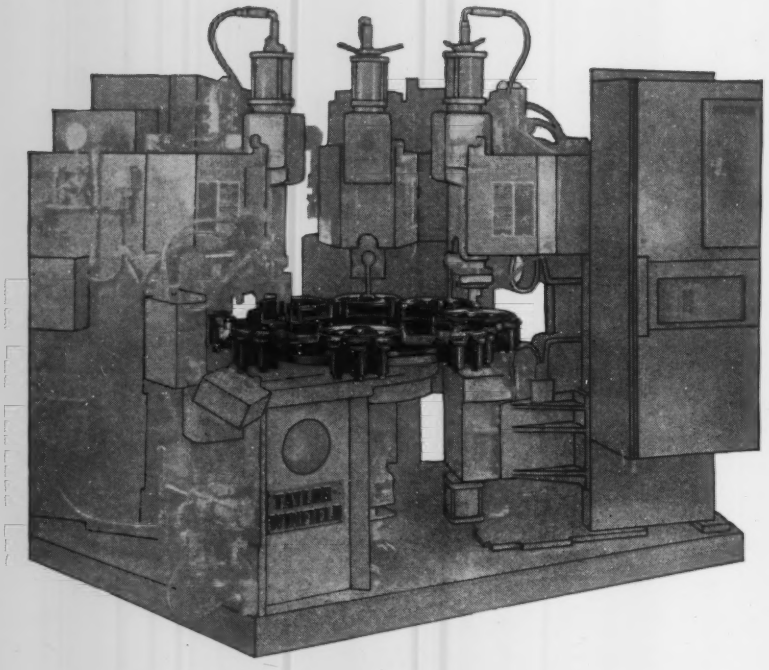
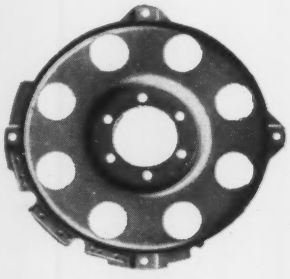


T-W Mechanized Handling Triples Standard Weld Production

Three standard projection welders, mounted around a rotary index table, assemble automobile flex-plates at 600 per hour. In service, this flex-plate connects the automobile flywheel to the crankshaft.

One operator loads three counterweights and a flex-plate on an index table fixture. The machine automatically indexes and welds the weights to the plate at three separate stations. The operator loads continuously and assemblies are unloaded automatically.



Flywheel Flex-Plate

Your use of specially-arranged standard welders readily permits modification, if required by future product design changes. Contact the nearest T-W office for prompt attention to your weld production requirements.

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OAKVILLE AND WINDSOR, ONTARIO

ANNEALING CONTROL...

(*Concluded from page* 153)

strip chart Speedomax recorder-controller. The instrument has proportioning type electric control, which operates electric motors to position four butterfly valves on separate cooling air lines. Electrical bias adjustments on the drive units permit variation in the relative amounts of cooling air to each section of the zone.

Resists Wear

A plastic lining on a sandblasting barrel has increased its life twelvefold

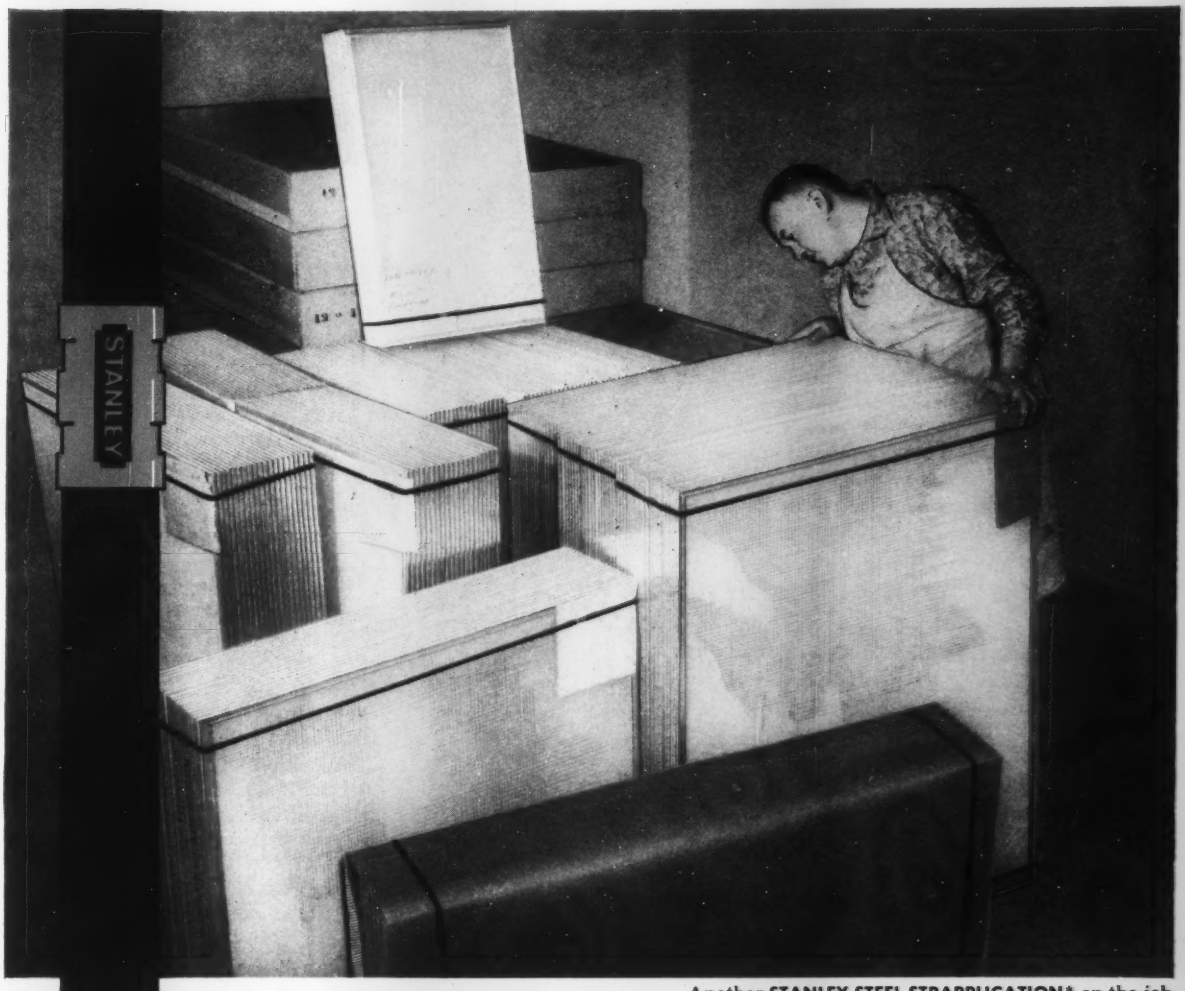
SANDBLAST barrels lined with a plastic (plastisol) last 12 times longer than unlined ones, say officials at the Underwood Corp.'s plant at Hartford, Conn. The operation: Finishing small typewriter parts.

Coating—To reduce replacement cost and down time, Underwood spray-coated the barrels with Unichrome 5300, a plastisol made by Metal & Thermit Corp., New York. It is a 100 per cent solid, polyvinyl chloride which is abrasive and chemically resistant. The firm also uses a similar coating for its plating racks and tanks.

Plastisol-lined barrels have stood up under constant use for three years. They can be relined.

Calculated savings for three years: $385 per barrel.

This tray of typewriter parts has just been removed from a sandblast cleaning. The plastic coating resists abrasive action, increases barrel life



Another **STANLEY STEEL STRAPPLICATION*** on the job

"Screen Test" cuts packaging costs

Following a test demonstration by the Stanley Steel Strapping Specialist, this California company started using Stanley Steel Strapping to secure ten to twenty-five screens in bundles for shipment by truck. The packaging job is done in one-third the time and at one-third the cost of the former method. Often, the entire load is now steel-strapped to the truck.

"Far superior to our former method of enclosing screens completely in corrugated board and binding with plastic tape." That's what this manufacturer says about THE STANLEY STEEL STRAPPING SYSTEM.

Chances are the Stanley Steel Strapping Specialist can show *you* how to effect equally important savings in time and money. He'll demonstrate — on the job — the SYSTEM . . . with the TOOLS — hand or power — that can make these savings possible. WRITE FOR YOUR FREE COPY of the "Stanley Strapplication Manual of Packaging and Shipping" to STANLEY STEEL STRAPPING, Division of The Stanley Works, Dept. F, 1476 Lake Street, New Britain, Conn.

**The system-atic way to solve specific packaging and shipping problems*

INSURE IT-SECURE IT WITH STANLEY STEEL STRAPPING

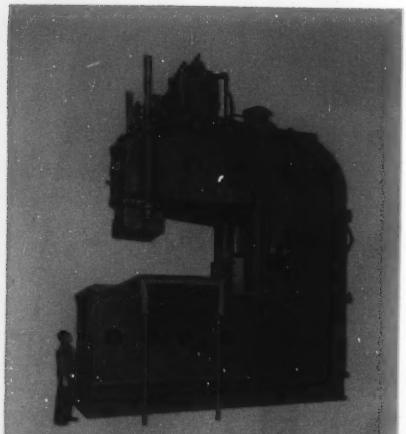
AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

STANLEY

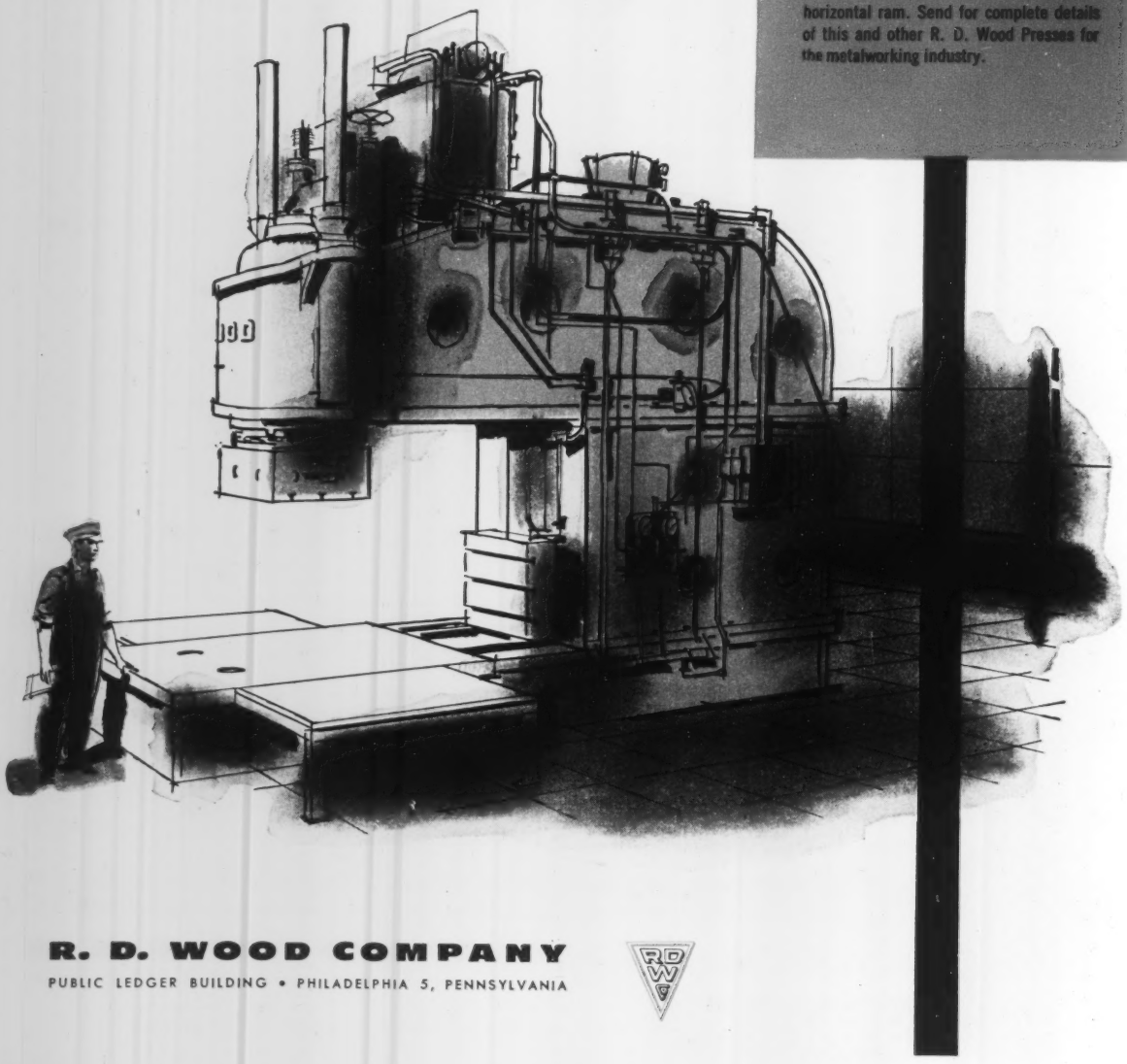
This famous trademark distinguishes over 20,000 quality products of The Stanley Works—hand and electric tools • drapery, industrial and builders hardware • door controls • aluminum windows • metal parts • coatings • steel and steel strapping—made in 24 Stanley plants in the United States, Canada, England and Germany

There's always a job for a Wood Press... and a Wood Press to do the job

When you want a production shortcut—when downtime and costs need shrinking—there's a job for a Wood Press. And in almost every type of metalworking operation—there's a Wood Press to do the job. R. D. Wood makes standard presses for an amazing range of uses, besides designing others for special work. All have three things in common: sound design, carefully chosen materials, conscientious workmanship. *Result:* R. D. Wood Presses consistently deliver the utmost in smooth, dependable performance; fast, economical production; trouble-free operation. Write for catalog and engineering information—without obligation.



750 ton, HydroLectric open gap, self-contained press for straightening, flanging, forming, forcing and bending operations. Handles all metals. Valve system contains centralized controls for both main ram and horizontal ram. Send for complete details of this and other R. D. Wood Presses for the metalworking industry.



R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Machine Feeds Manganese

Promotes savings by making additions directly to the ladle. Recovery is higher

ELEVEN ladle addition feeders are being added to the Campbell, O., works of Youngstown Sheet & Tube Co. following a year's trial with a single feeder. The machine is designed to make ferromanganese additions to the ladle rather than to the bath, resulting in substantial economies. One will go to each of the 12 Youngstown open hearths.

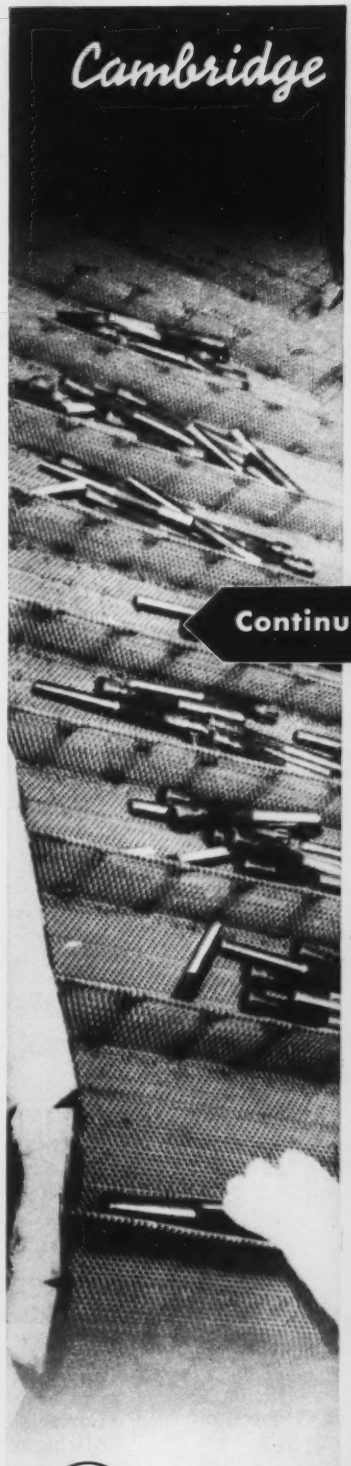
A new product of Blaw-Knox Co., Pittsburgh, the feeder was originally developed by A. J. Boynton & Co., Chicago, for the Lone Star Steel Co., Lone Star, Tex. According to the users, the feeder at Lone Star produces an average saving of 15 cents per ton of ingots.

Savings — Production at Lone Star requires an addition of 28 to 30 lb of 80 per cent ferromanganese per ton of ingots. Experience with over 2000 heats indicates that up to 31.5 lb of ferromanganese per ton of ingots can be added successfully to the ladle.

Economies result, test data indicate, because 10 per cent more manganese is recovered when additions are made to the ladle rather than to the furnace. Lone Star recovered 85.3 per cent of the man-

(*Please turn to page* 162)

Filling the hopper loader



WOVEN WIRE BELTS give you greater production capacity and product uniformity

Belt-to-belt flow of products through annealing, brazing, sintering, tempering, oiling or quenching operations at a controlled rate of speed increases production and assures uniform treatment of parts. By combining movement with processing, woven wire conveyor belts cut costs, eliminate batch handling, simplify operations. EXAMPLE:

Continuous Heat Treating

ALL METAL BELT moves bolts up and through heat treating cycle at a steady, even rate of speed to assure uniformity of treatment. Special alloys withstand temperatures from sub-zero up to 2100° F.; woven wire construction gives longer life because there are no seams, lacers or fasteners to break.

OPEN MESH permits free circulation of atmosphere around all parts of the load to eliminate hot spots and assure uniform treatment. Open mesh also allows quenching or oiling solutions to drain quickly, thoroughly.

SPECIAL CROSS FLIGHTS and raised edges hold product on belt during flat or inclined travel.

OPTIONAL CHAIN DRIVE provides positive motion for heavy loads or inclined movement. Friction drive easily handles most loads.

Cambridge Woven Wire Conveyor Belts are made in any size, mesh or weave, from any metal or alloy, and can be used under a wide range of conditions . . . hot or cold, wet or dry. Call your Cambridge Field Engineer to find out how continuous processing on woven wire conveyor belts can give you greater production capacity and uniformity. Look for his telephone number under "Belting, Mechanical" in the *Yellow Pages*. Or, write for FREE 130-PAGE REFERENCE MANUAL.

The Cambridge Wire Cloth Co.

WIRE CLOTH | WOVEN WIRE CONVEYOR BELTS | WIRE CLOTH FABRICATIONS

Department J, Cambridge 6, Maryland

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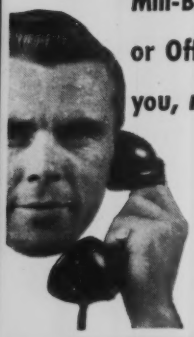

Call the Carpenter Mill-Branch Warehouse or Office nearest you, *now* . . .

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at the people waiting to go into action when you call

Have you called Carpenter lately?

When you do, we believe you'll find a *personal satisfaction* in getting the kind of specialty steel service you want and need today.

The people shown here are typical of the *specialists* in the Carpenter Mill-Branch Warehouse near you. Working as a team, they offer you increasingly better service on specialty steels.

Suppose, for example, you need fast delivery on a tool, stainless or alloy grade. From the man on the order desk . . . to the one who processes your order . . . to the man who delivers it — each one does his best to earn your business.

What's more, they're backed by unusually ample stocks of all grades and sizes of *Carpenter Quality* steels. Short lengths can be quickly processed to meet your most exacting requirements . . . your most pressing emergencies.

In addition, information on prices, sizes and grades is yours for no more than a phone call.

And your Carpenter Representative brings helpful service whenever needed. From providing practical technical literature — all the way through to trouble-shooting an unusual production problem — he's a good man to know.

To get this full measure of service on specialty steels, call the Carpenter Mill-Branch Warehouse nearest you. See what a difference it makes to work with conscientious people backed by ever-increasing stocks of quality specialty steels. The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.

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Woodside, New York
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It's the Lodestar®
the newest of hoists... the first truly heavy-duty version of the small electric hoist.

Lodestar offers you features and performance never before available in a small electric hoist.

Lodestar is priced surprisingly low because of its more efficient design and automated production.

THOUSANDS ALREADY IN USE

CAPACITIES from ⅛ to 1 ton. Single and 3 phase. ¼ ton size weighs only 51 lbs.

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- Push Button Control
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CM HOISTS AND CHAIN

LADLE FEEDER . . .

(*Concluded from page* 159)

ganese, compared with 75.3 normally recovered.

Construction — The feeder, now being made by the Steel Plant Equipment Department of Blaw-Knox, consists of a hopper, hopper loader, electrical vibrating feeder and chute. Designed to the operating conditions of the shop in which it will be used, the unit will feed manganese at a controlled rate and to the correct location in the ladle. Control of feed and placement permits a narrow manganese specification.

A self-dumping mechanism is built into the Youngstown feeders. In case of electrical power failure while tapping a heat, an air cylinder tilts the hopper, delivering the ore to a chute where it flows by gravity into the ladle. The hopper loading mechanism is also air operated.

Typical location for the ladle addition feeders is on the furnace platform near the tapping spout.

Additions are started normally when the ladle is approximately 20 per cent full and are stopped when it is 80 per cent full. Rate of feed is adjusted by turning a small handwheel on the control panel. Rate of addition varies from 10,000 lb of manganese in 3 minutes to 3000 lb in 20 minutes. The feeder holds 10,000 lb.

Plating Magnesium

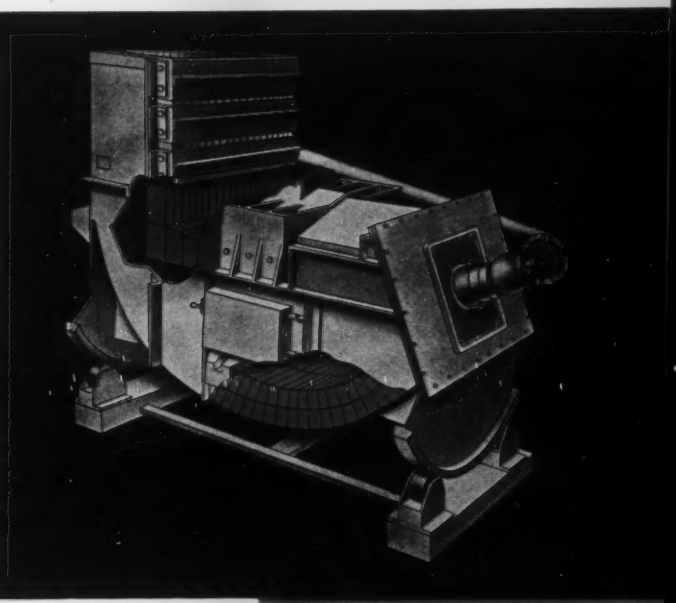
VAPOR plating with aluminum may be the way to make magnesium more resistant to corrosion.

A report just issued by the Office of Technical Services, Department of Commerce, describes a technique developed by Air Force research. It involves the decomposition of unstable aluminum compounds.

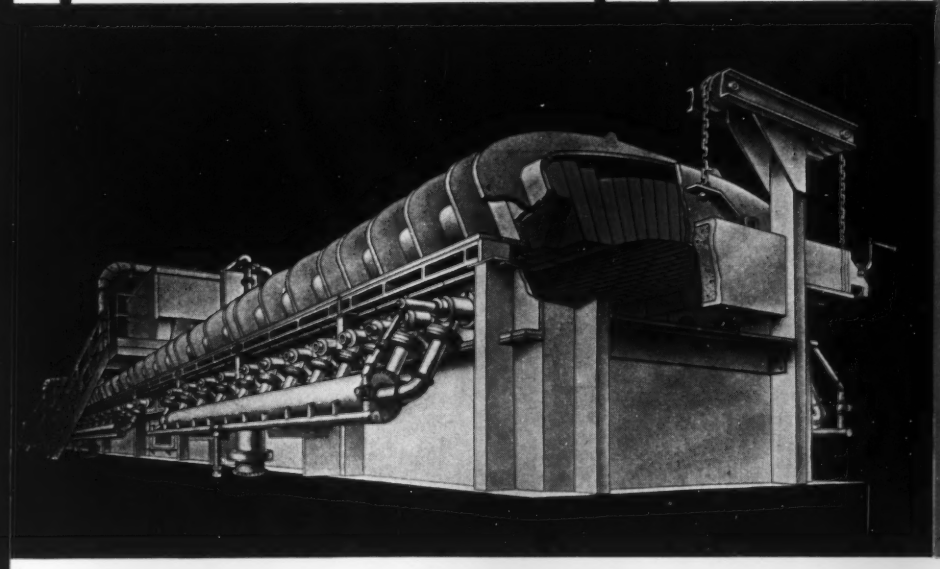
Most promising is the pyrolysis of aluminum alkyls, aluminum hydrides and derivatives at low pressures and at temperatures between 752 and 932°F.

You can get the report by sending 75 cents to OTS, U.S. Department of Commerce, Washington 25, D.C. Ask for PB 121860, "A Study of the Feasibility of Coating Magnesium with High-Purity Aluminum."

Why B&W Allmul Firebrick withstand punishing service in furnaces like these



▲ Direct-fired reverberatory furnace for melting brass, aluminum, and iron. For longer refractory life, B&W Allmul Firebrick are used to line the bath and arch.



◀ In this type of furnace for continuous high speed heating of strip for welding into pipe, temperatures in excess of 3000 F are common and the atmosphere is contaminated with iron oxide. Because of their resistance to spalling and metal penetration, B&W Allmul Firebrick have set new standards for refractory life in bungs, burner blocks and recuperators.

B&W Allmul Firebrick stand up under extremely high temperatures at continued high rates of operation because they are produced from electrically melted mullite grain by a highly efficient process. These top-quality brick have high hot-load strength, high resistance to spalling, good volume stability and a melting point of 3335 F.

They are practical from a cost standpoint for a wide range of applications in the ferrous and non-ferrous metal industries. Illustrated on this page are a butt-weld furnace as well as a direct-fired reverberatory furnace. Other services are direct and indirect-arc electric furnaces, air furnaces, furnace hearths subject to iron oxide scale attack, crucible melting units and furnaces melting many non-ferrous metals and alloys.

Your B&W representative can show you how B&W Allmul can lower your refractory costs in many heavy-duty services. Consult him or write for Bulletin R-34A, giving data on B&W Firebrick for exacting services.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

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1857

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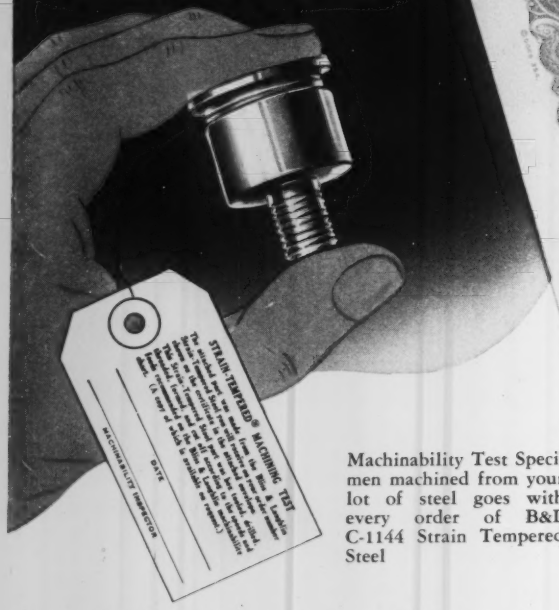
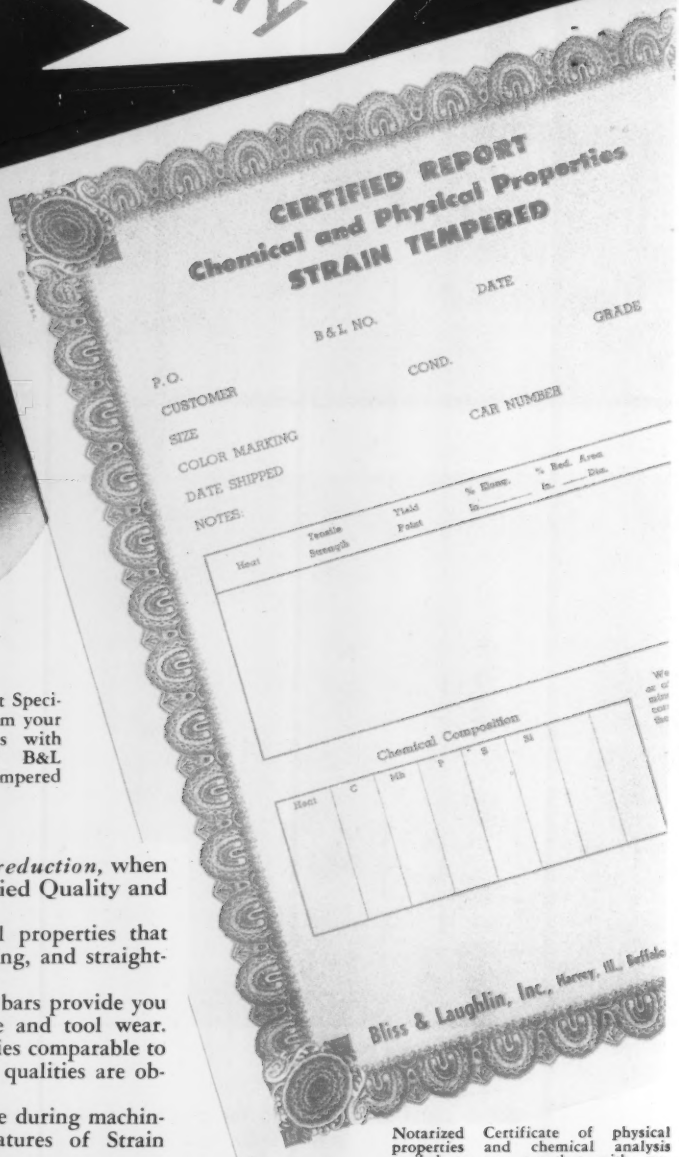
B&L

Strain-TEMPERED BAR STEELS



Machinability Test Specimen machined from your lot of steel goes with every order of B&L C-1144 Strain Tempered Steel



Notarized Certificate of physical properties and chemical analysis mailed to you together with machined test part . . . a *New Service* for Bliss & Laughlin customers.

Here's why *better production* goes with *cost reduction*, when you rely on Strain Tempered* Bars of Certified Quality and Tested Machinability:—

1. Strain Tempered* bars provide high physical properties that save you costly additional heat treating, cleaning, and straightening operations.
2. When replacing Alloy steels, Strain Tempered bars provide you with substantial economies in machining time and tool wear.
3. Strain Tempered bars possess wearability qualities comparable to those found in more costly steels where these qualities are obtained only by additional heat treatments.
4. Minimum distortion and freedom from warpage during machining operations are further money-saving features of Strain Tempered Steels.

*Trade-Mark Registered.

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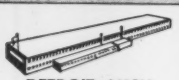


DETROIT, MICH.

BUFFALO, N. Y.

MANSFIELD, MASS.

Canmakers Turn to Coils

They forecast lower costs and less dependence on the mills. Next steps planned are tinless cans and canmaking machines fed directly from coil stock

THE LONG talked of revolution in canmaking is getting started. In Tampa, Fla., American Can Co. unveiled an inspecting and shearing line that starts with coiled tin plate and processes 600 ft of sheets a minute.

A month before, construction began on a similar line in Milwaukee. Another is being built at Hammond, Ind. Before it is through, American Can will have poured $27 million into automated tin plate lines at eight plants.

First Step—For the time being, the lines will take on the same operations that were handled by the steel mills—uncoiling, leveling, inspection, shearing and stacking—but they'll do the job faster and with less handling.

The strip is visually inspected for surface appearance and electronically inspected for pinholes before it passes into the flying shear. An electronic device remembers imperfections and automatically sorts out substandard sheets after they are cut.

The price structure of tin plate has been heavily influenced by the handling normally required in processing sheets. Canco expects to combat rising steel prices by purchasing its can stock in coils up to 15,000 lb. In steel plants in which tin plate is rolled, effects of the change can be seen in the empty stations in the sheet inspection lines.

Second Step—Even more revolutionary are Canco's plans to do away with dependence on tin, heretofore a necessity for high-speed soldering. In its research laboratory at Barrington, Ill., it has the prototype of a high-speed can welding machine which it hopes will eliminate the soldering of side seams. It will also be useful in the joining of cans made of hard-to-solder materials.

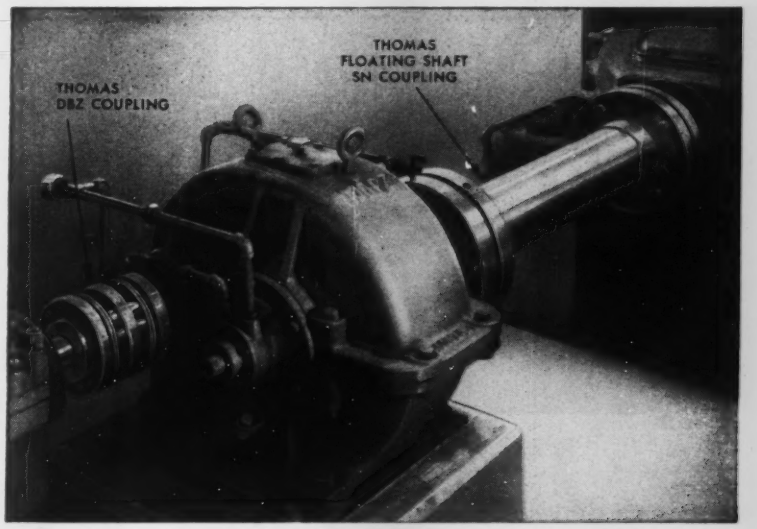
Also in the plans are high speed organic coating lines. The company is developing fast drying, high polymer enamels that can be applied directly to the strip, or after the cans are formed. A wide range of metals and metal combinations, plastics, paperboard, laminates and foils are being studied in the search for materials which will conserve or eliminate tin from the canmaking picture.

Ultimately, Canco plans to feed canmaking machines directly from coils. When that stage is reached, the company feels it will be possible to eliminate some of the intermediate steps.

A pilot line incorporating many of the necessary steps is already in operation.

THOMAS FLEXIBLE COUPLINGS

Give You Freedom From Coupling Maintenance



NO LUBRICATION NO MAINTENANCE NO WEARING PARTS

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Couplings should last a lifetime.

Under Load and Misalignment only Thomas Flexible Couplings offer all these advantages:

1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING COMPANY
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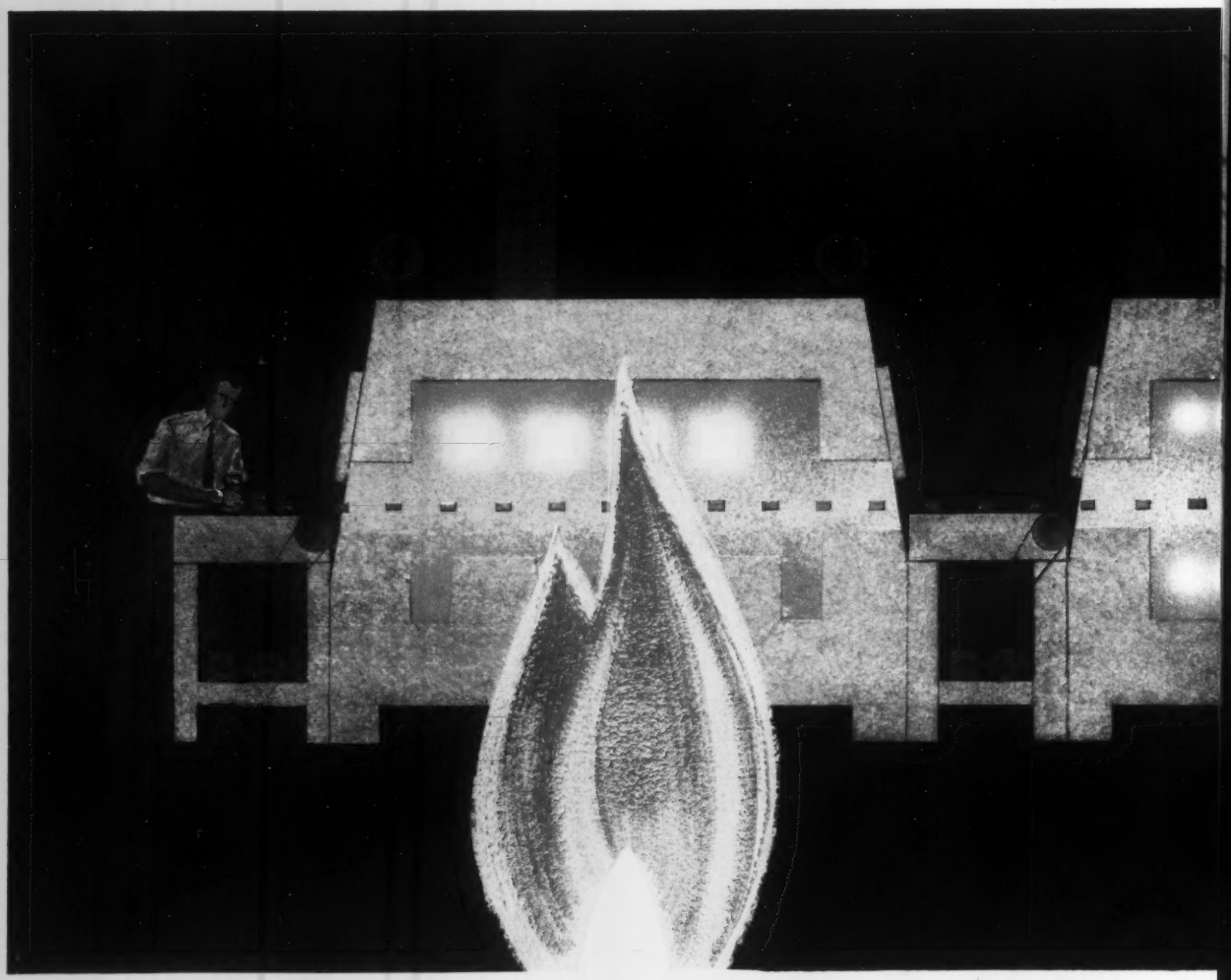


They* prevented heat-treating

You may be adding extra labor to your costs if you haven't reviewed heat-treating maintenance. Over 40% of the furnaces in operation today are obsolete . . . at least 60% are over 20 years old. To keep production profitable, it makes sense to specify Westinghouse equipment—developed to keep heat-treating at lower cost.

*RESULTS—

a better way to lower sintering costs

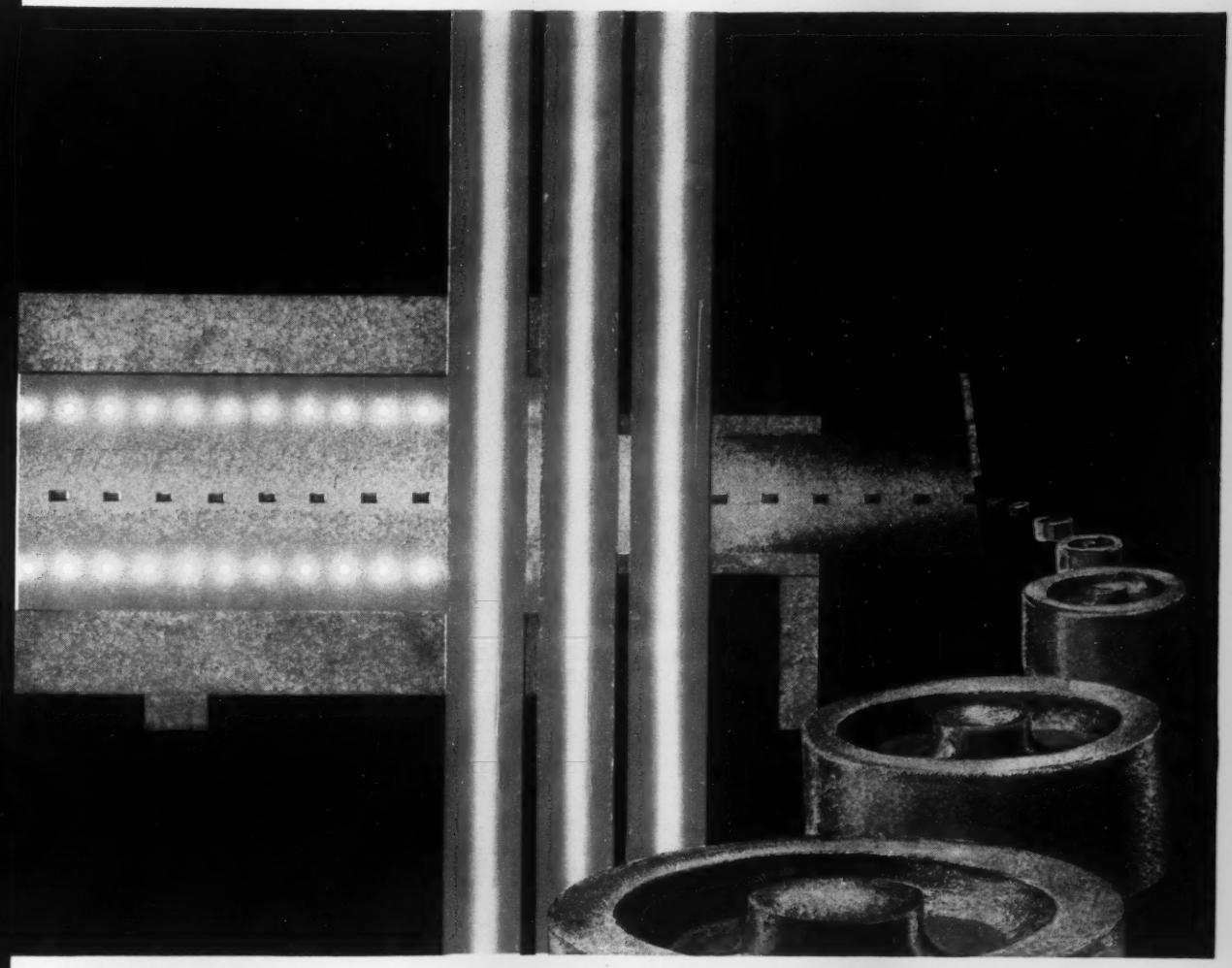
A company sintering caster wheels with conventional high-temperature heating equipment used to experience frequent shutdown due to carbon deposits.

Today—they sinter continuously with a Westinghouse roller-hearth furnace that gains advantage by using *both* gas and electric heat. Carbon is driven off by low-temperature gas firing. High-temperature electric heat completes final sintering.

Westinghouse engineering puts complete equipment answers in your hands

Our engineers design complete heat-treating systems using gas or electric furnaces or induction heating. From a single source you get the latest equipment answers to coordinate work handling, complete cycle control, atmosphere preparation, furnace design and construction, quenching arrangements and safety precautions.

YOU CAN BE SURE...IF IT'S



shutdown...you can too

. . . with these flexible, timesaving steps

1. Start by calling your local Westinghouse industrial heating representative. His analysis and on-the-spot suggestions develop your objectives.

2. Engineering and metallurgical specialists bring together equipment designed to meet these objectives.

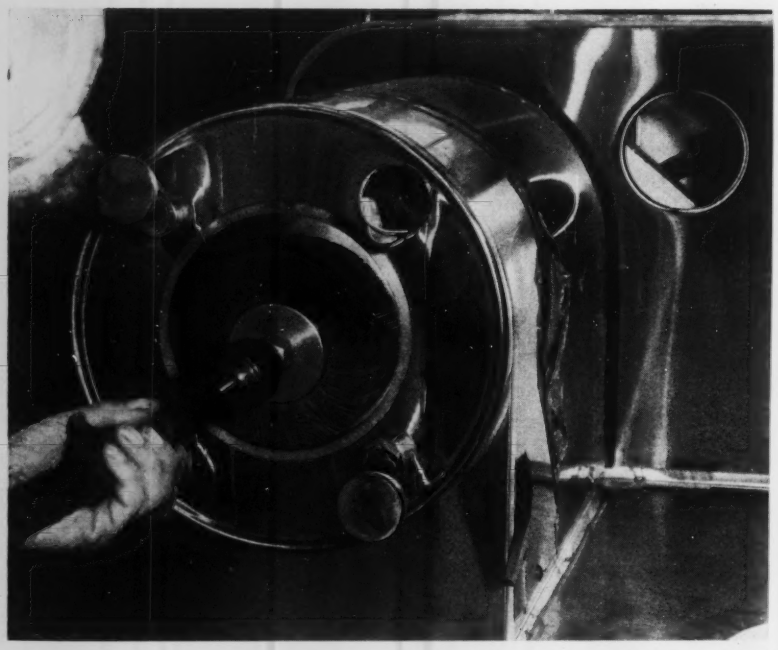
3. Westinghouse Metallurgical Research Department and Metals Pilot Plant may be called on for process improvements or test runs under simulated conditions.

4. Westinghouse responsibility for your heat-treating system does not end until test operation has acquainted your personnel with actual use.

Call in your Westinghouse representative today or write Westinghouse Industrial Heating Division, Meadville, Pa. J-10464

NEW . . . Westinghouse 20-page book, *Metals Heating—Gas, Electric and Induction.* Write for your copy to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

Westinghouse



This small PG wheel, mounted on a flexible shaft grinder, polishes the inside of an ice cream evaporator. The wheel cut finishing costs 75 per cent

Leaves of coated abrasive fastened to a hub form a powerful new tool that cuts and polishes metal, glass, plastics or wood. Its popularity with metal finishers is gaining

PG Wheel Aids Finishing

DORMEYER Corp., Chicago, cut finishing costs 66 per cent. General Equipment Mfg. Co., Indianapolis, reduced them 75 per cent. A vacuum cleaner maker doubled production on its finishing line.

The common denominator of those savings is a coated abrasive product called PG wheels. The maker, Minnesota Mining & Mfg. Co., St. Paul, points out these advantages:

Parts often don't have to be buffed after polishing.

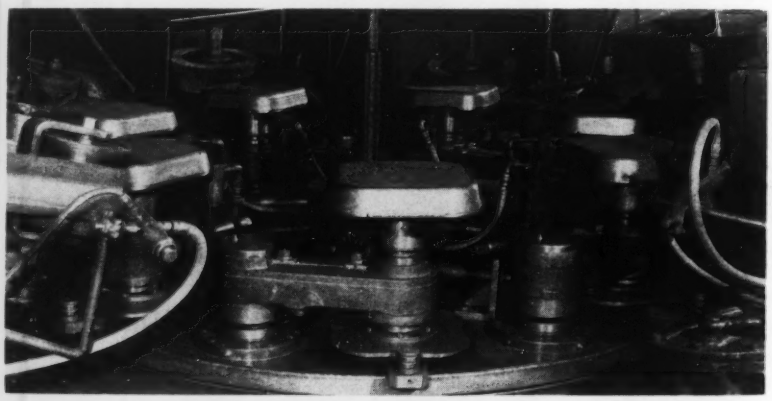
You can buff finish and remove mild draw marks with the same wheel.

The wheels last longer.

Applications—Versatility is another big asset. The wheels can be easily mounted on polishing lathes, bench grinders, portable, flexible shaft tools and automatic equipment.

They remove stock, polish, deburr, blend, generate scratch patterns and remove paint and rust. The larger ones (12 in. in diameter and up) are more effective for light stock removal than the smaller diameter wheels, which are better for blending and pattern finishes.

The PG is made of fabric leaves that are coated with aluminum oxide, silicon carbide and garnet



Two coated abrasive belts (left) and four PG wheels are combined in this automatic machine to finish the sides of a stamped aluminum frying pan. Wheels contour themselves to fit the pan profile

For better service to you Jessop acquires Green River Steel Corporation

Green River Steel Corporation of Owensboro, Kentucky, one of the newest alloy steel plants in the country, now is a wholly-owned subsidiary of Jessop Steel Company. This fact will result in benefits to the customers of both companies. If you buy steel from Jessop, you have been buying the broadest variety of top quality alloy, high-speed and stainless steels obtainable anywhere. Now with the splendid new and modern melting facilities of Green River in the picture, service from Jessop will be broader and quicker. If you are a Green River customer, you'll enjoy higher quality and more products and the benefits of the exclusive Dornin Process used by Green River which provides steel of unmatched forging qualities and grain structure. If you haven't been buying from either company, this is a good time to start. Write to Jessop.

These Jessop district offices and representatives can now service you with Green River Products

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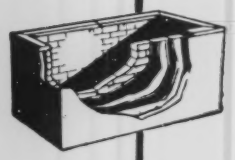
plant wide protection from corrosion

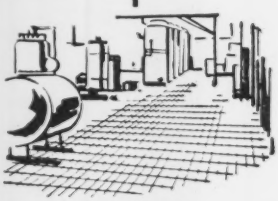
TANKS



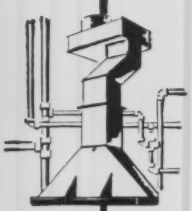
all types of pickling, plating, chemical processing, storage and other tanks containing corrosive chemicals are constructed of Atlas materials.

FLOORS

industrial floors are designed to resist attack of a wide range of corrosive spillage, including acids, alkalies, solvents, salts, greases and detergents.



HOODS, DUCTS, FUME SYSTEMS



completely resistant self-supporting rigid plastic structures are designed and fabricated to meet your specific requirements . . . complete plastic pipe systems including flanges, valves and fittings are also available.

PLANT INTERIORS

protection of all corrodible surfaces is possible by using the proper Atlas coating . . . vessel exteriors, walls, beams, ceilings can be coated for lasting service.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

Atlas provides a complete corrosion service from on-the-spot technical advice through engineering design to complete construction facilities to carry the job from beginning to end.

ATLAS PRODUCES THE MOST COMPLETE LINE OF CORROSION PROOF MATERIALS OF CONSTRUCTION AVAILABLE FROM ONE MANUFACTURER

WHEEL FINISHING . . .

abrasives which cut metal, glass, plastics and wood. Backings include drill and jeans cloth. Three types of bond are used: Glue, glue and resin, and straight resin.

A 16 incher has about 1000 leaves of coated abrasive material. The leaves are 4 in. from hub to working edge. That's about 4000 in. or 330 linear ft of working abrasives. At 1750 rpm, the wheel travels at 7300 sfpm, so 1,750,000 abrasive leaves contact the work every minute. Both mineral and backing wear equally so that a new surface is constantly presented to the workpiece.

Other Advantages—Coated abrasive wheels leave a finer finish than coated abrasive belts, setup or grinding wheels. A 50-grit PG wheel produces a finish comparable to that of a 60 or 80-grit belt. That is particularly true of small wheels.

The PG doesn't need to be reglued or recoated with mineral grains. Oil sprayed on the wheel or workpiece lubricates the job.

Wheels don't fill up easily since only the tips of the leaves touch the work. In normal use, any abrasive that fills up is easily worn away.

Flexibility helps the wheels conform to simple contours. They shape themselves to more complex shapes and are easily preshaped to fit the most severe profiles.

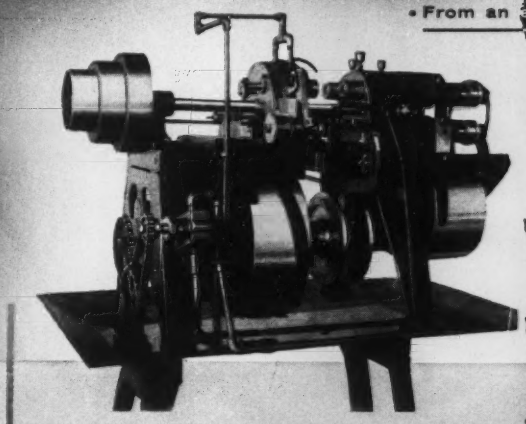
Rules—Four factors influence the kind of work you get: Abrasive, pressure, speed and lubrication. Light pressure is best for most work. On automatic machines, wheel heads should either float or be cammed to follow the contour of the workpiece.

Exceptions—A polishing line completely equipped with these wheels isn't always the answer. Occasionally, you may find it's necessary to use a final buff. Sometimes, coated abrasive belts are used for heavy stock removal prior to finishing.

On rough grinding, including stock removal and snagging, the wheel isn't supposed to compete with heavy duty, resin bonded, coated abrasive belts. Discs, especially type C with a fiber backing, are better for weld grinding and heavy stock removal.

Thanks, Mr. Keebler...

You have said it better than we could!



First successful multiple-spindle automatic — the granddaddy of *all* of today's "multiples" — developed and built by National Acme in 1893.

• From an editorial in April, 1957 **AUTOMATION**

by JAMES C. KEEBLER, Associate Editor

this tubing annually that the price

Those who think of automation only in terms of production techniques developed since Harder first uttered the magic word *Automation* are thumbing right past a few useful rules. If we aren't careful these newly trained manufacturing engineers will be overlooking a few tricks that have been in the trade since Hector was . . .

Overpublicizing the new developments might overshadow the fact that the methods developed long ago fit the pattern of present-day automation techniques and therefore should not be overlooked in evaluating possible production processes.

A case in point is the automatic screw machine used on these bearing rings. This machine development was placed on the market in the 1890's and incorporated such sound basic automatic machine thinking that it remains primarily the same in principle in its 1957 model.

On these machines are performed in succession and without manual attention virtually all of the circular machining operations required on ball bearing rings. This is automation. Just because the technique is not new is no reason why it should not be given its just place in the galaxy of automation studies.

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• History has recorded the machine tool development about which Mr. Keebler writes as the direct prototype of present day Acme-Gridley Multiple Spindles—in fact, it's the granddaddy of *all* of today's "multiples".

• Since the inception and development in 1893 of the first successful Four Spindle Automatic Screw Machine, National Acme has extended the inherent circumferential automation principle of its basic design to six and eight spindle machines. These machines have set the pace with which to meet, head-on, industry's need for greater and less costly production.

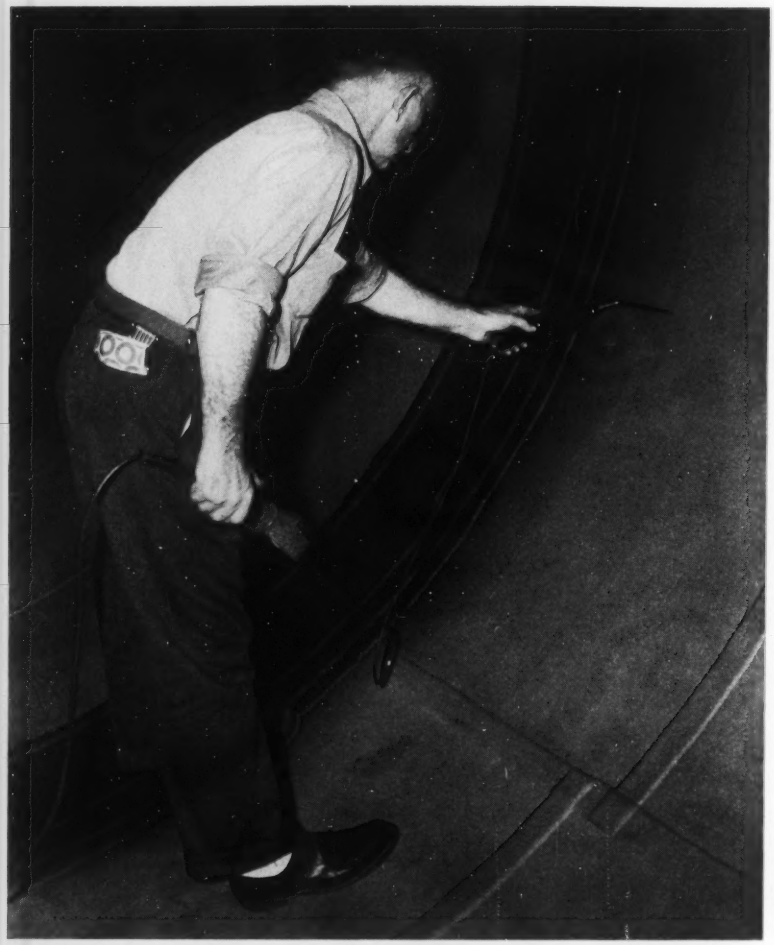
• Knowing that the future will make ever greater demands on circumferential automation, National Acme will continue to expand applications for Multiple Spindle Automatics. Who knows?, some day the line may include not only 4, 6 and 8 spindles, but 12 and 16 spindle machines as well.

National Acme

THE NATIONAL ACME COMPANY, 170 E. 131ST ST., CLEVELAND 8, OHIO • Sales Offices: Newark 2, N. J., Chicago 6, Ill., Detroit 27, Mich.

Preventive maintenance in pickling operations starts when the equipment is in the planning stage and continues until the tank lining is replaced

By CARL M. JACOBSON
Sales Engineer
B. F. Goodrich Industrial Products Co.
Akron



Inspector uses an electrostatic tester to find pinhole leaks in tank lining

Make Pickling Tank Linings Last Longer

STEEL lined with rubber or rubberlike materials has almost replaced concrete, wood and lead in pickling tanks.

While this eases fabrication and maintenance problems, it leads to new ones. For instance, the linings are sensitive to physical abuse and should be handled carefully.

Cautions—Most rubber linings will burn. Vinyl linings heat-soften at higher temperatures. Many of the adhesives are thermoplastic and should not be used above their recommended temperature limits.

Select lining materials for adequate resistance to chemical attack, remembering their physical limitations.

Early Repairs—In working with equipment, you must recognize potential trouble early. Shut down the unit, drain it and make preparations for repair when the damage is still minor.

Small pinholes in a lining membrane can be repaired quickly and effectively, often without a metal patch. Unattended leaks soon mushroom into major repair jobs. Trained plant personnel can make minor repairs, but it may take a skilled factory mechanic to take on a major job.

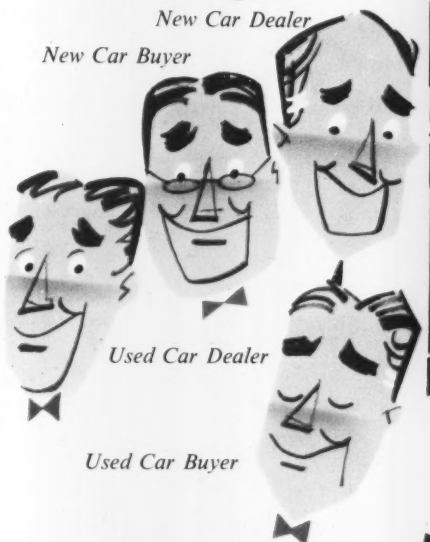
Getting the maximum service life from linings requires proper planning before the lining is applied, in design and construction of metal parts, in installation and in intelligent maintenance.

Before Lining Is Applied

Provide complete information on service conditions to the lining manufacturer. This includes kind and concentration of solution to be handled and any possible contaminants, and the solution's sensitivity to contamination or discoloration.

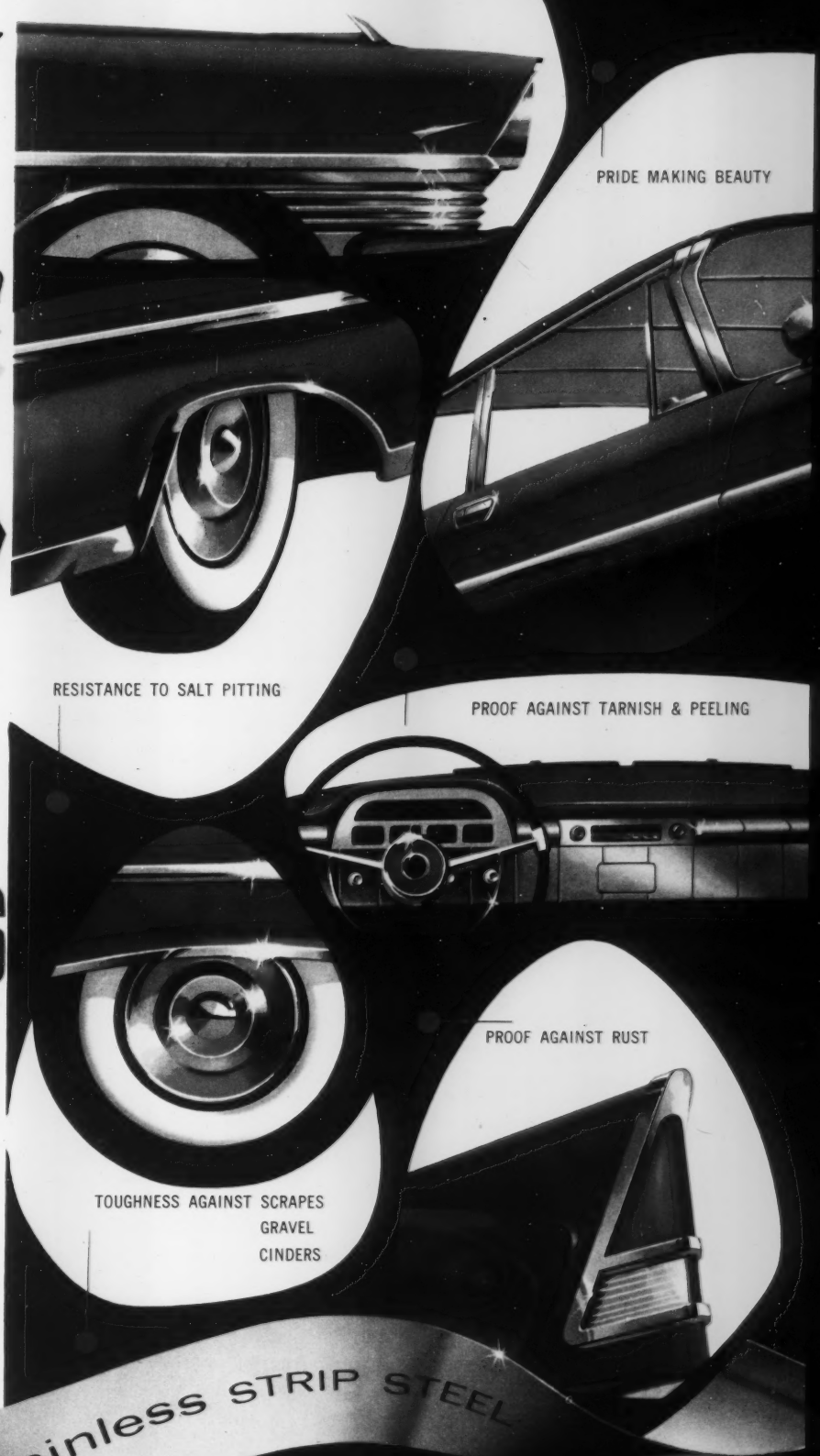
The manufacturer also should

Everybody's happy



with Automobile trim of Stainless Steel

On the showroom floor—on the highway—in and out of the used car lot—all the way to the ultimate owner, *stainless steel* pleases everyone! Stainless keeps selling itself because it's *the metal that does not deteriorate.* Always bright. Always beautiful. So easy to care for. *So satisfying to find on your car.*



Superior Stainless STRIP STEEL

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

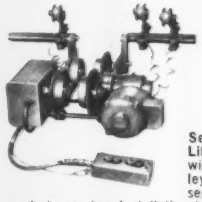
IF YOU WANT ALL THIS IN A HOIST

- ☐ 30 FPM lifting speed at the push of a button.
- ☐ Two automatic brakes — separate load and motor brakes — each so powerful it can hold the full load safely alone.
- ☐ Accurate load control — no back drop — for easy, precise "spotting".
- ☐ Safe 24-volt magnetic push-button control, plus great structural strength in every part to protect operator, load and hoist.
- ☐ Heavy-duty electrical equipment, including motor and controller especially developed for hoist service.
- ☐ Low operating and power costs because of the simply designed mechanism and maximum use of anti-friction bearings.
- ☐ Easy service-ability *in the air*, including one-point lubrication of the compartmentized gearing and load brake that operate in oil. No costly production hold-ups.
- ☐ Convertability from lug to hook, to push trolley, to motor-driven trolley *anytime* right in your own plant.
- ☐ Top performance under the most unfavorable operating conditions.

YOU WANT A SERIES "600" LOAD LIFTER

There's a whale of a difference in wire rope electric hoists — and the through-and-through quality of the Series "600" 'Load Lifter' is proving it every day on all kinds of production jobs. It solves tough hoisting problems — operates "like a charm" on a continuous duty cycle. In rigorous tests, a Series "600" 'Load Lifter' was loaded to capacity. The load was raised three feet 151 times an hour until 80,000 lifts had been made. This punishment is equal to more than two years of average industrial use. No appreciable wear was evident on any of the parts. Even the cable was in good usable condition.

Such quality is your assurance that the Series "600" 'Load Lifter' is today's most economical buy in a wire rope electric hoist of ½ or 1-ton capacity. *Get complete feature and specification data from your "Shaw-Box" Distributor or write us for Bulletin 408.*



Series "600" 'Load Lifter' Electric Hoists with motor-driven trolley. Trolley available separately for hoists already in service. Installation takes only two hours with common tools.

'Load Lifter' Jib Cranes. Self-supporting. Full revolving. Swing easily on ball bearings. No binding. A hoist on this crane can serve a 550 sq. ft. area. Capacities to 5 tons.

Cord Reels to keep the hoist conductor cord taut and up out of the way of work and worker. Also useful for small cranes and other devices with motors up to 1HP.

57F-3

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

'Load Lifter'® **ELECTRIC HOISTS**

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

384 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.*

SIMONDS

INDUSTRIAL CUT GEARS

LARGE OR SMALL HEAT TREATED OR PLAIN

SIMONDS has over 60 years' experience in cutting quality industrial gears. We can supply any type of gear in cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite in a full range of sizes adaptable to the material. Also heat-treated, case or flame hardened gears of carbon or alloy steel. Send us your requirements for quotation.

Custom GEAR CUTTING

SIMONDS' facilities can produce any type of custom gear from your blanks if you prefer. Same quality . . . same prompt service.

QUALITY GEARS FOR OVER 60 YEARS

SPUR GEARS
BEVEL GEARS
MITRE GEARS
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Also stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

SIMONDS GEARS

THE SIMONDS GEAR & MFG. CO.

LIBERTY at 25TH PITTSBURGH 22, PA.

PICKLING TANK LININGS . . .

know the maximum, minimum and average service temperature; the heating cycle; and the method of applying heat (steam jets or other localized heating methods require additional protection). When high temperatures are expected, use brick sheathing.

Other Factors—When an abrasive condition is anticipated, advise the equipment supplier of the particle size, velocity of particles and possibility of impact damage.

Let him know if there are any critical clearances. In normal lining operations, it is necessary to use thicknesses in some areas.

Design and Construction

Metal parts should be heavy enough to keep them from flexing or bending. Avoid designs in which the solution is heated through the rubber (water or steam jackets).

Welding should be solid, peened (and ground if necessary) to avoid pinholes and porosity; eliminate sharp corners if possible. All areas to be rubber covered must be accessible for hand work.

Equipment Installation

Allow adequate clearance for periodic inspection and painting. Avoid excessive bolting pressures on rubber covered flanges; a compression allowance of 25 per cent is normally satisfactory.

If the joint will be broken before the equipment is discarded, use a flange lubricant. This can be flake graphite or other material that will not affect the lining.

Circulation—If the vessel is to be used at higher than ambient temperatures, install it so adequate air can circulate around it.

After installation is complete and before any thermal protection (such as brick) is in place, carefully inspect the lining surface. Any suspicious areas which may have been damaged during shipment or installation should be tested with an electrostatic spark tester and repairs made before putting the tank into service.

Maintenance

Protect the outside of the vessel with corrosion resistant paints or additional lining. In those areas subject to splash or drip of acid, such as the outside delivery end

(*Please turn to page* 179)

Tempilstiks°

THE CRAYONS THAT TELL TEMPERATURES

IT'S THIS SIMPLE

- Select appropriate TEMPILSTIK° for the working temperature you want.
- Mark your workpiece with it.
- The TEMPILSTIK° mark melts as soon as its temperature rating has been reached.

Accuracy within 1% of rated melting point.

Also available as TEMPILAQ° (liquid form) and TEMPIL° PELLETS

63 different temperature ratings available

For information and samples, send coupon

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134 West 22nd St., New York 11, N.Y.
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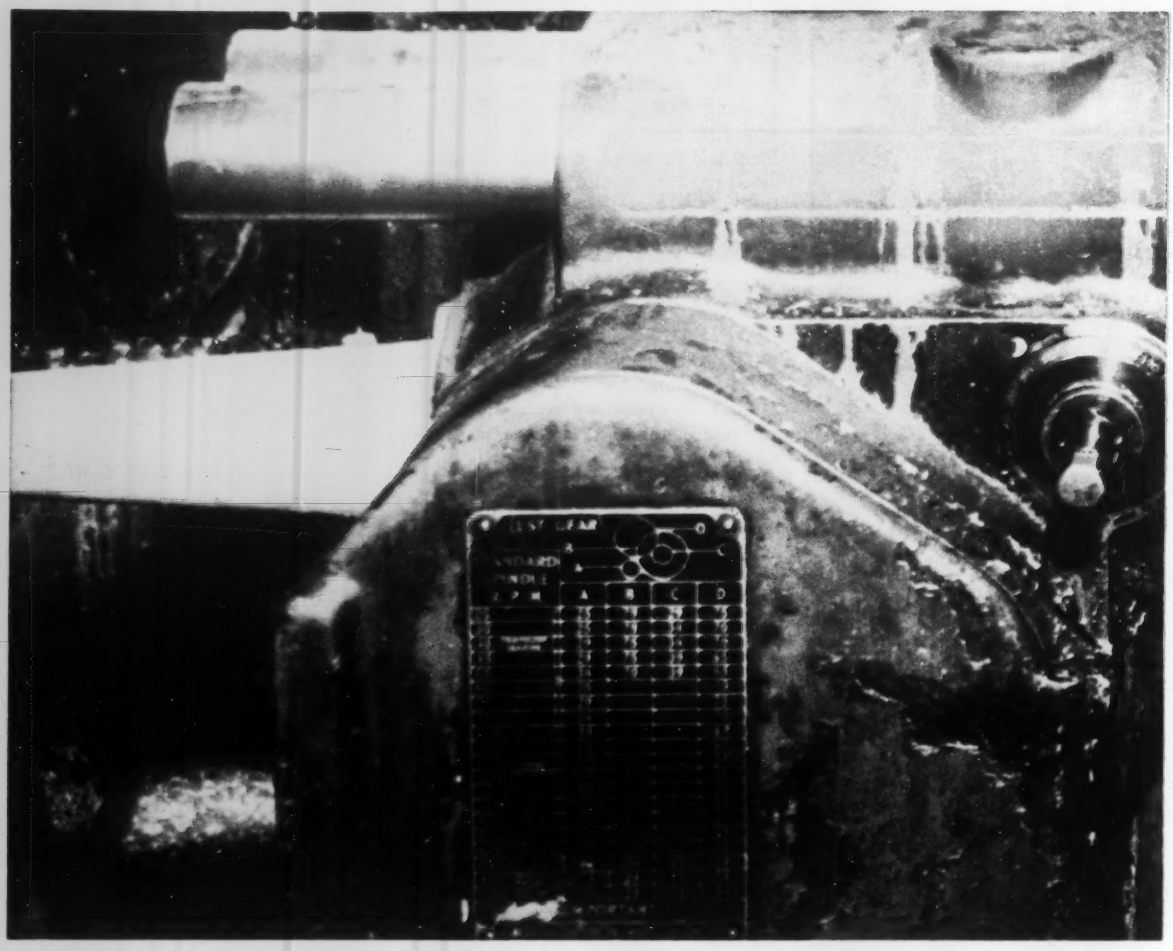
☐ TEMPILSTIK° ☐ TEMPILAQ° ☐ TEMPIL° PELLETS
☐ Send booklet "How Temperatures are Measured"
☐ Send sample pellets for _____°F temperature

Name_____
Address_____
City_____
State_____



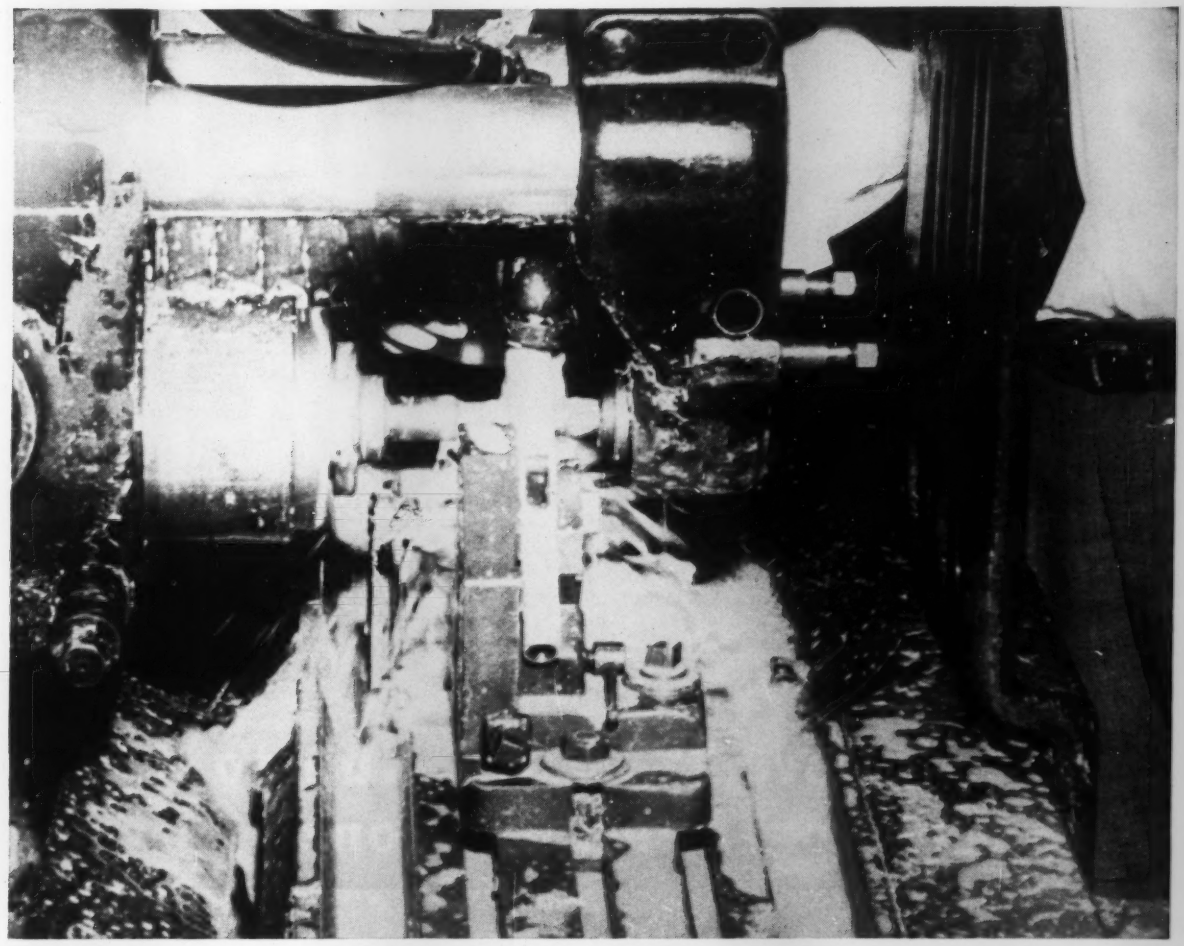
100% Efficiency Was Fine

What % Increase in production can you make by using ANTISEP All-Purpose Base? ...the results will be worth a test

It's hard to improve on 100%, but we did. The Houghton Man was right. Of course, we really only *thought* we were getting *all we could* from our machines. But ANTISEP All-Purpose Base made such a difference when we made our initial test that we placed an order immediately.

Mixing ANTISEP 1:20 parts water gives our machining work better cooling and greater lubricity than any oil-base product we ever used. And the result is faster cutting. Nuisances like smoke, rancidity and chip build-up are eliminated. The most surprising fact in the switch-over to ANTISEP is that we actually realize a cost saving, too!

You can get finish quality that is limited only by the fullest capabilities of tool and machine. To be sure that you're really getting your 100%-plus efficiency, try ANTISEP. The Houghton Man offers ANTISEP Base as one of a complete family of superior cutting oils and bases. He has a fine background to help you get more from your machines. Call him in.



Until He Said It Could Be 115%

HOUGHTON'S FAMILY OF CUTTING OILS AND BASES:

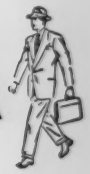
Cut-Max	Series of fortified ready-to-use cutting oils and concentrated bases for dilution by user.
Antisep All-Purpose Base	Miscible with either water or oil; for 90% of all machining uses.
Hocut	Transparent water-soluble coolant.
Antisep Soluble Grinding Oil	Antiseptically treated; detergent action; releases grinding dust.
Houghto-Grind 50	Grinding concentrate; stops rust, won't load wheel.
M. M. Honing Oil	Beats kerosene for honing.

ANTISEP

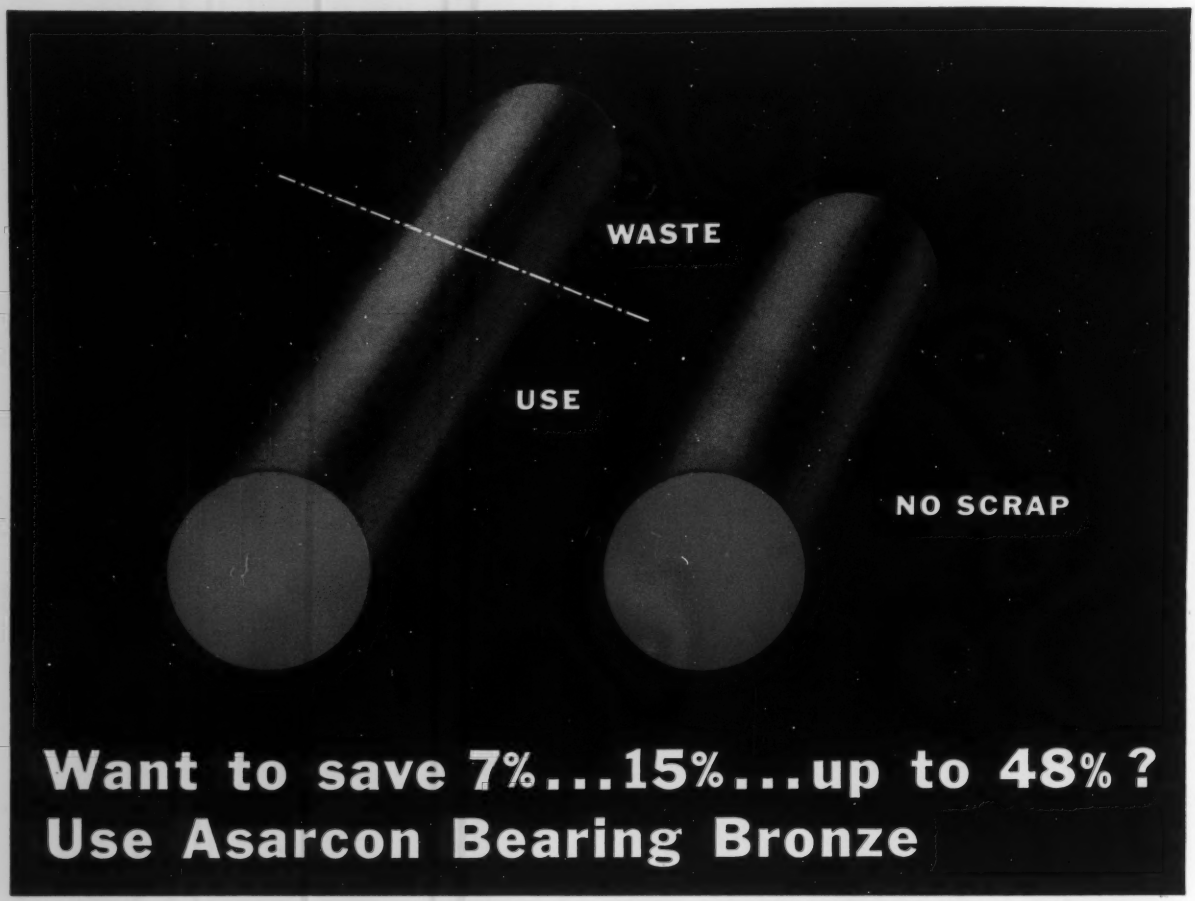
...a product of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO



Ready to give you on-the-job service...



Want to save 7%...15%...up to 48%? Use Asarcon Bearing Bronze

When you buy standard 13-inch bronze bars, you have a "remnant" problem.

A one-inch remnant on a 13-inch bar, is a 7.6 per cent loss; a two-inch remnant is a 15.3 per cent loss; and, if you bought a 13-inch bar when you needed only 6¾-inches, your loss could run as high as 48 per cent.

When you buy Asarcon 773 Continous-Cast bearing bronze, however, you can get the *exact* lengths you need, all the way up to 105-inches. You save on short-end scrap; moreover, you'll find that you're saving on diameter losses and machining time as well. For, with Asarcon 773 you order the *diameters* you want, up to 9-inches. The clean-up allowance for the size you specify is in the piece you get, and is less than the common ¼ inch on rough-cut bars; and Continous-Cast cored bars save you costly machining time plus the weight of the core metal.

Asarcon 773 (SAE 660) is stocked—in 260 sizes, solids and tubes – by a national network of conveniently located distributors. Talk to one of them, or write directly to us. We'll be glad to show you how other companies are turning short-end scrap losses into savings.

ASARCO

Continuous-Cast Products Department

AMERICAN SMELTING AND REFINING COMPANY

Perth Amboy Plant, Barber, New Jersey • Whiting, Indiana

WEST COAST SALES AGENT: Kingwell Bros. Ltd., 457 Minna Street, San Francisco IN CANADA: Federated Metals Canada, Ltd., Toronto and Montreal

PICKLING TANK LININGS . . .

(*Concluded from page* 175)

of pickling tanks, covering with a thin lining costs little extra and is more effective than paints.

Protect natural rubber linings from severe exposure to sunlight and the elements. Some synthetic linings give better results if they are exposed to the elements.

Welding—Linings must be protected from exposure to direct flame or hot metals. Do not weld rubber or rubber-like lined metals except in an emergency. If it is necessary, use arc welding only.

Protect ebonite or hard type linings from severe mechanical and thermal shock. Rubber has a coefficient of expansion about seven times that of steel. In cold weather there is real danger of damage due to thermal shock when the more rigid compounds are used.

Service Conditions—Be alert to the damage that can be caused by alternating from one service condition to another. Usually, linings are formulated for a specific acid service. Wash out tanks only when absolutely necessary; use water sparingly.

If rubber lined equipment is temporarily out of service, fill the vessel with the solution regularly handled rather than storing dry. If this cannot be done, ask the supplier to recommend a procedure.

Mixing—When sulphuric acid solutions are used, it is customary to mix the solution in the vessel. This procedure is satisfactory if the lining is protected.

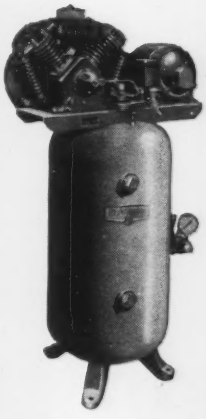
If concentrated acid is poured into a brick-lined tank, the acid will permeate the brick and attack the lining. Water added later will not have its diluting effect soon enough to prevent lining damage.

Solvents—Don't subject the linings to solvent type chemicals such as petroleum distillates, gasoline, kerosene or oils; coal tar derivatives such as benzol and toluol; and chlorinated hydrocarbons such as chlorbenzol and carbon tetrachloride. Excessive concentrations of inhibitors made from coal tar bases are harmful.

In general, clean and uncluttered areas are conducive to good maintenance practices. Control of fumes will greatly increase the service life of such equipment.

Second-hand test answers:

Should you replace your air compressor NOW?



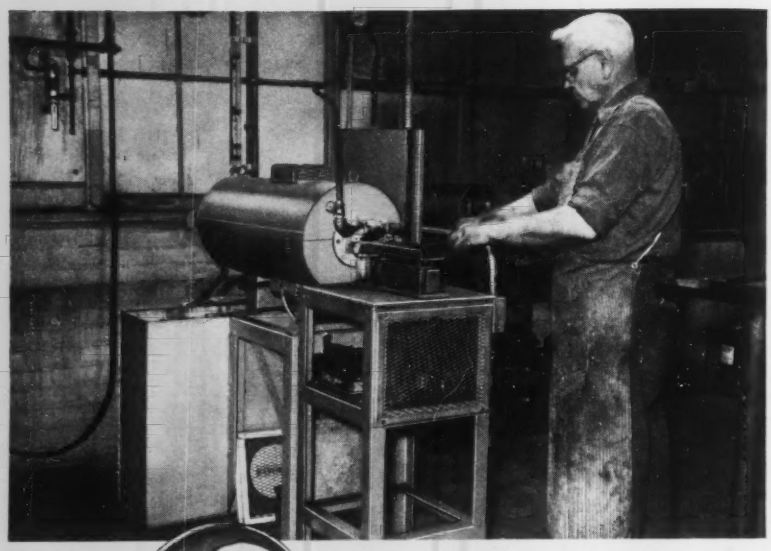
DeVilbiss air compressors, with low-friction design, in horizontal or vertical models, ¼ through 15 hp.

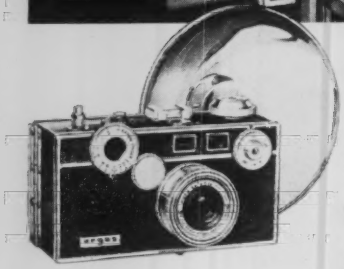
An air compressor that *runs* well can fool you into thinking, "It *works* well, too!" Fact is, it may be running far more than it should, and inflating your compressed-air costs way out of proportion. That's because current consumption is the major expense item for compressed air.

A simple test with your own watch quickly and accurately tells if you'll be money ahead to install a new DeVilbiss compressor now. You may find you're already paying for a new compressor through too high operating costs! Phone your DeVilbiss jobber for DeVilbiss Compressor Form CL-b, containing test details. *The DeVilbiss Company, Toledo 1, Ohio.*

FOR BETTER SERVICE, BUY

DEVILBISS





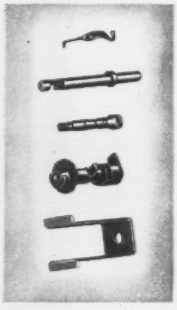
"20% SAVINGS IN TIME, ...IMPROVED RESULTS" with HEVI-DUTY SHAKER HEARTH FURNACE, says **argus cameras.**

Argus, world's number one name in color slide equipment, reports that their Hevi-Duty Shaker Hearth Furnace has case hardened 20% more parts per hour, with less labor, and greater uniformity than any previous method used. All of the small parts that make Argus cameras the precision instruments they are, are treated in one Hevi-Duty Shaker Hearth Furnace.

They chose this furnace for the following reasons:—

1. Reaches operating temperature rapidly and wastes no heat on belts or trays.
2. Endothermic atmosphere in furnace chamber prevents decarburization and oxidation.
3. Quenches directly from furnace, reducing distortion and eliminating scale.
4. Requires less labor than tray or basket loaded furnace.
5. Time at required temperature can be easily regulated.
6. Consistent temperatures throughout the furnace chamber are assured with multiple zone control.
7. Electric heating elements provide clean, safe heat.

If your product has intricate metal parts, write for Bulletin 850 to find out how the Hevi-Duty Shaker Hearth Furnace can save you time and money, yet improve the quality of these parts.



These parts from the Argus C-3 and C-4 color slide cameras are typical of the parts treated in the above Hevi-Duty Shaker Hearth Furnace.

HEVI-DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Heat Treating Furnaces... Electric Exclusively

Dry Type Transformers *Constant Current Regulators*

Strengthens Zipper

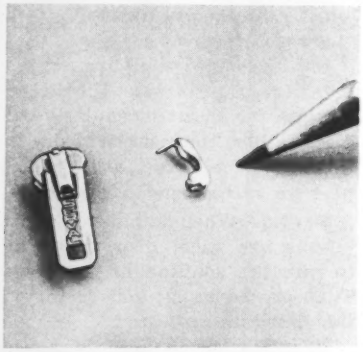
Beryllium copper is said to be the best metal for zipper springs. It resists corrosion

THE strength of zipper handles is increased by beryllium copper, says the Beryllium Corp., Reading, Pa. It lists these advantages for the tough metal:

1. It's noncorrosive.
2. It has greater fatigue resistance than similar nonferrous metals.
3. It's excellent for springs.
4. It's easily plated.

Function—The slider of a zipper has three main parts: The body which fits around the teeth, the tab you grab and the bail or metal loop which connects the tab and slider.

Zippers get their locking action from pins or cams on the ends of the tabs. Pushing the tab flat against the zipper locks it. The automatic types have springs for that purpose.



THIS BAIL
. . . eliminates an extra part

Serval Slide Fasteners Inc., Flushing, N.Y., combines the spring and the bail in a single part made from beryllium copper. It passes the requirements of Federal Specification QQ M 151.

Here's how they are made:

Forming—The bails are formed on a 15-stage progressive die which turns out 35,000 bails a day. The metal strip (Berylco 25) feeds directly from rolls into the press.

These are the operations: Piercing two pilot holes, pick up holes, pierce three holes, bending and cutting from strip.

Scrap isn't a great problem even

6,000 horsepower in a single CLARK CBA-8 balanced/opposed compressor

Now, for the really big applications, Clark introduces the most powerful compressor ever built—the new CBA-8. The ability to handle tremendous horsepower, however, is not the only feature of this new compressor. Being extra heavy and rugged in all respects, it is the perfect choice for those services where extremely high pressures are required such as in the process industries and for high pressure wind tunnel applications.

High discharge pressure invariably causes a high pressure rise across the cylinders which results in heavy pin loads. The new CBA-8 is designed to carry pin loads of 100,000 pounds with ease. For large air compressor installations, at normal pressures, the CBA-8 will operate with minimum maintenance because of its heavy construction. The balanced/opposed design principle, originated by Clark, assures vibrationless operation.

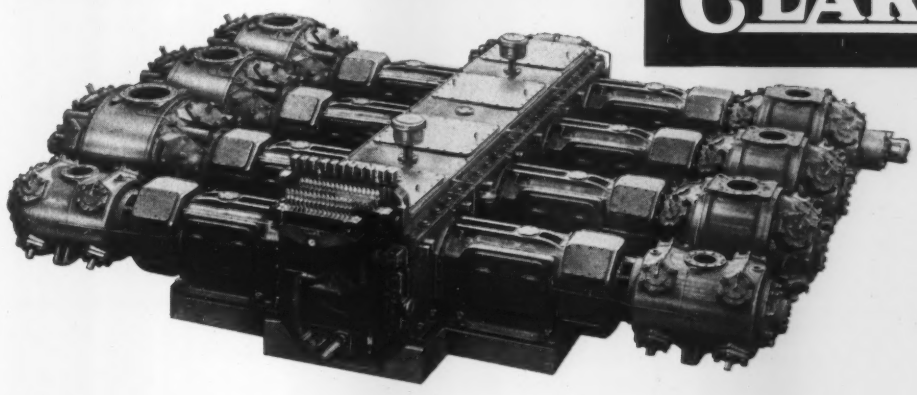
Two new CBA-8 units already have been delivered for a special application. Your Clark representative will gladly give you full details on this new unit.

CLARK BROS. CO. · OLEAN, N. Y.
One of the Dresser Industries
Sales offices in Principal Cities Throughout the World

Balanced/Opposed Compressors

CLARK®

ONE OF THE DRESSER INDUSTRIES



A new MODERN process...

Shown here are Models No. 4CBS and 20CBR for bonding linings to metal cones of automatic transmissions. Custom-tailored fixtures adapt the machines to other automotive, aircraft, electrical and industrial applications.

Automatic Control of Bonding Production

MODERN'S Positive-Control bonding machines give you peak control efficiency over all prime factors—time, temperature and pressure. Lets you tailor output to needs. An adhesive curing process that can be used for bonding any two parent bodies together with adhesive agents. The machines range from fixed single-station to rotary forty-station types and automatically control the variables of bonding to any desired degree of absolute control. For full details, write for our new Bulletin CB-1.

MODERN®
Industrial Engineering Co.
14230 BIRWOOD AVE., DETROIT 38, MICHIGAN

STRENGTHEN ZIPPER . . .

though 80 per cent of the strip is waste. The material is returned for credit to the Beryllium Corp.

Formed bails are aged in batches by immersion in a 650°F salt bath for 2 hours. That is followed by a quick brightening dip in acid. The parts are assembled on an automatic machine developed by Serval.

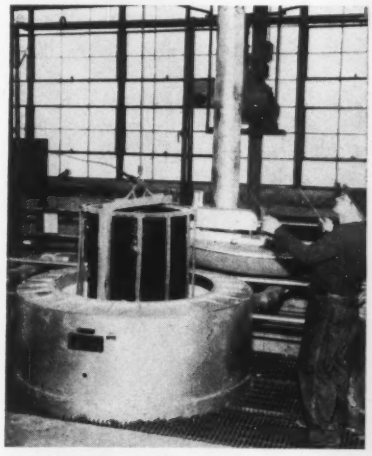
Testing — Completed fasteners are pulled up and down 10,000 times. That's the equivalent of a half million pulls in regular use.

During the tests, the bails wear grooves in the tabs. They don't fail under a 90-lb pull.

Corrosion resistance is necessary to combat the effects of salt in perspiration and other elements like sea water. Zippers get a five-stage test. They are put in a cabinet and fogged with a spray of salt water at 90 to 100°F. The beryllium copper doesn't show any sign of corrosion after 24 hours.

Beside withstanding a pulling force of 35 lb, the spring must release the tab when pulled by a force of 1½-lb. Spring action of the copper doesn't fail after 10,000 pulls.

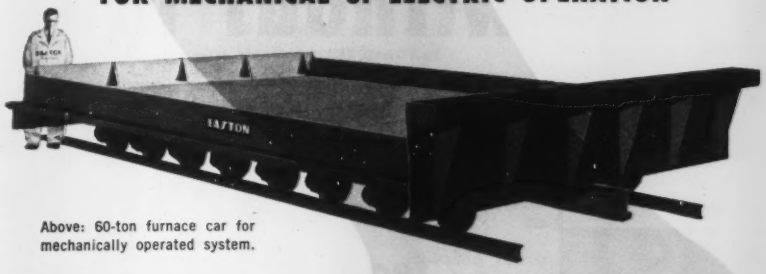
Tempering Furnace



Heat treating jet engine parts in this furnace prevents erosion. Compressor blade rings are being unloaded from a Surface Combustion draw furnace. The basket was designed to facilitate use of an overhead hoist to discharge the rings. One charge weighs about 940 lb. Parts are tempered at 1100 to 1200°F for 2 to 6 hours

Furnace Cars

FOR MECHANICAL or ELECTRIC OPERATION



Above: 60-ton furnace car for mechanically operated system.

CUSTOM-BUILT and quality-built for dependable service. Easton experience includes all types of furnace and transfer cars for modern heat treating systems. Built to any desired capacity.

Write or telephone for technical information.

CUSTOM BUILT

A-1052 TRADE MARK

EASTON®

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

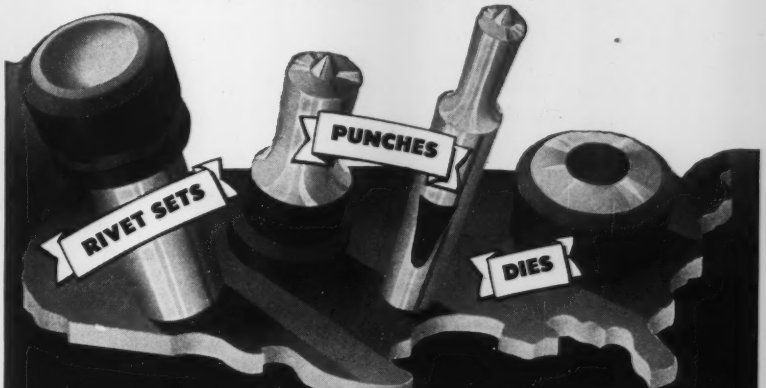
MANUFACTURING NATIONALLY FOR 54 YEARS

GFM

Punches, Dies, Rivet Sets, "Heatproof" Compression Dies.

Round, square, oblong Punches, Dies and Rivet Sets carried in stock.

Write Dept. A for catalog 54 and new stock list.



GEO. F. MARCHANT COMPANY

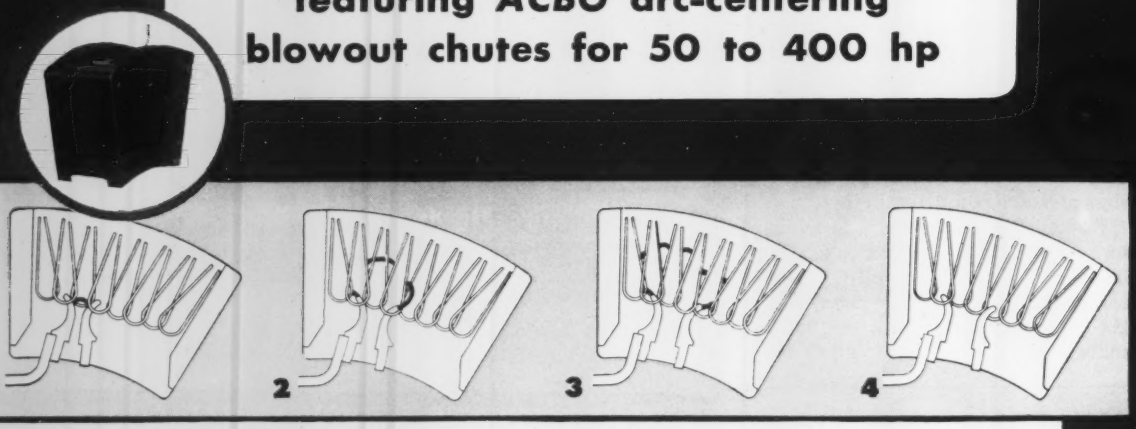
1420-34 So. ROCKWELL STREET · CHICAGO 8, ILLINOIS

for fast arc interruption... without blowout coils

ALLIS-CHALMERS

TYPE 425 CONTROL

featuring *ACBO* arc-centering blowout chutes for 50 to 400 hp



1 — Arc across contacts as they start to open.

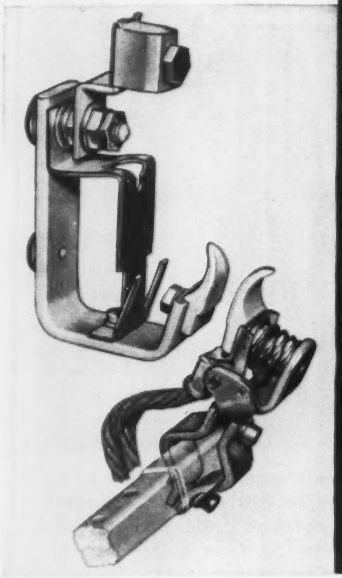
2 — Strong blowout action forces arc to center.

3 — Arc rupturing.

4 — Contacts fully open — arc extinguished.

Advanced electrical design

Allis-Chalmers Sizes 4, 5 and 6 Type 425 starters and contactors incorporate the *ACBO* arc chute for much longer contact and chute life . . . for maximum contactor efficiency . . . for improved performance. This unique but simple device utilizes the principles of magnetic action and thermal convection to center, rupture and extinguish the arc — *quickly* . . . without the use of conventional blowout coils.

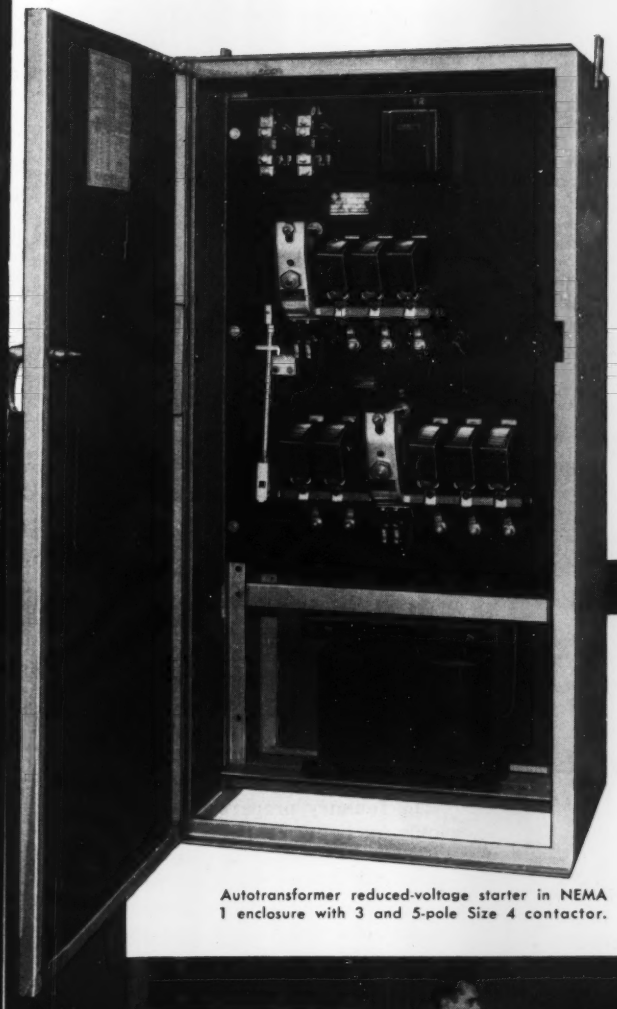


Simplified mechanical design

- Streamlined clapper-type construction eliminates many parts — permits natural arc rise in arc chute.
- Accessibility simplifies inspection and maintenance.
- Installation is fast and easy. Ample wiring space is provided by *sensible* enclosure dimensions . . . by well-placed concentric knockouts, terminal lugs and conduit hubs. Terminals are clearly marked.

ALLIS-

STEEL



Autotransformer reduced-voltage starter in NEMA 1 enclosure with 3 and 5-pole Size 4 contactor.

A type for any application

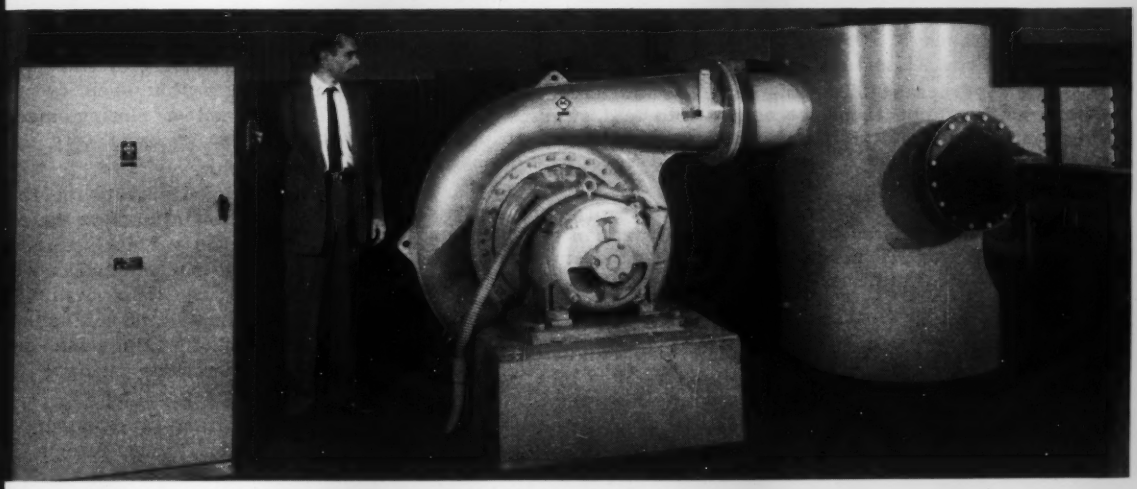
- Across-the-line general purpose starter
- Combination starter with disconnect switch
- Combination starter with circuit breaker
- Reversing starter
- Multi-speed starter
- Autotransformer reduced-voltage starter
- Primary reduced-voltage starter
- Magnetic increment-type starter (part winding)
- Magnetic star-delta starter
- Wound-rotor motor starter
- Synchronous motor starter
- Low voltage group control
- Ac magnetic contactor

Modifications available for applications requiring special features or design.

Engineering help

Allis-Chalmers offers expert engineering and application advice. Product specialists, industry application experts, modern laboratory and testing facilities . . . are all available for coordinated effort to help solve your control problems.

For detailed information on Type 425 control, call your A-C Control Distributor or your local A-C District Office . . . or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis. Ask for Bulletin 14B8615.



Size 4, reduced-voltage autotransformer starter for 50-hp, 3550-rpm induction motor driving turbo-blower. Motor and blower also built by Allis-Chalmers.

ACBO is an Allis-Chalmers trademark.

CHALMERS

A-5342

BUCYRUS ERIE HYDROCRANE

Basic Hydrocrane Design Builds Profits From MANY Angles

The basic advantages you get from the all-hydraulic Hydrocrane design eliminates hundreds of parts necessary in ordinary cranes . . . gives you a compact, lightweight machine that costs less to operate and maintain.

The Hydrocrane offers big capacity and unusual stability along with compactness, because strain and stresses of the working crane and its loads are supported by outriggers. These four steel legs extend, set and level the machine hydraulically.

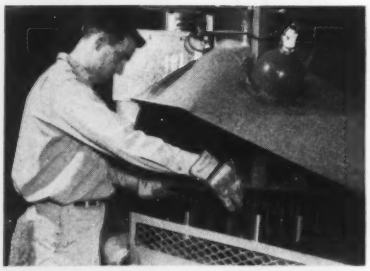
With outriggers to carry the load, the Hydrocrane mounts on a conventional truck giving you the advantages of mobility, convenient corner-station servicing and standard-truck repair parts. In addition, you can save right at the start by buying a suitable, inexpensive used truck on which to mount your Hydrocrane.

Unmatched precision control lets you handle loads precisely; telescoping boom reaches out for extra jobs; working boom hoist changes boom angles while swinging . . . at the flick of a lever; and a selection of hydraulically operated attachments are money-making improvements over rope-reeved clamshells, grapples, hoes.

The Hydrocrane's basic design gives you a multi-job speedster that handles jobs ordinary cranes can't touch. Start earning extra returns on your truck-crane investment now. Get the complete profit story on the 5-ton H-3 or the 10-ton H-5 from your Bucyrus-Erie Hydrocrane distributor. 210H57

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN



One shell makes cope and drag

New Use for Shells

Steel crankshafts for outboard motors are made in Evinrude's new million dollar foundry

TEN different crankshafts are made in the new foundry of Outboard Marine Corp.'s Evinrude Motors Division in Milwaukee. Production started early this year, three years after pilot operations indicated shell mold castings would weigh less and require less machining than forgings.

The foundry prepares about 120 molds an hour for pouring. About a ton of 4615 steel is poured into the molds during the same period. Each mold makes one to eight crankshafts, weighing 1.1 to 20 lb.

At the Center—The heart of the system is an automatic, four station, shell molding machine which can make a thin shell every 15 seconds, and a closing machine which seals cope and drag halves of the molds.

Twenty men operate the foundry. Four are stationed at the molding and closing machines, five do melting and pouring and two work alongside the conveyors. Some run machines—sand mixing, coremaking, shotblasting and cutoff. Other operations include heat treating and grinding.

Co-Operation—The foundry was designed by Evinrude and Link-Belt Co., Chicago. Link-Belt furnished shell molding and closing machines and conveying and elevating equipment.

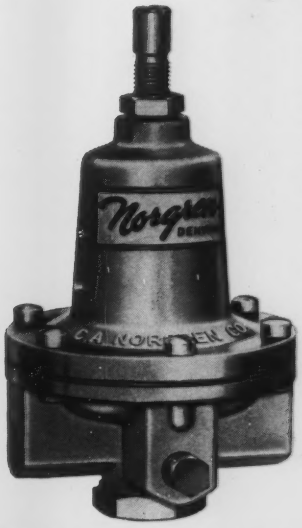
As a result of pilot operations, the cold coating method was selected to treat mold sand with iron oxide and resin.

Sand System—The handling of

Protect Your Equipment from Excessive Pressure Build-Up with

Norgren

RELIEF VALVES



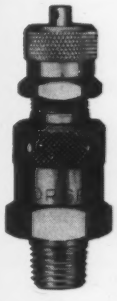
DIAPHRAGM TYPE VALVES

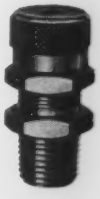
Automatically Protect against damage from excessive pressure build-up. Provides controlled operation for fluid recirculating systems.

Easily Adjusted to relieve at desired pressure. Relief settings up to 250 psi for pipe sizes ⅛" to ½" inclusive, and up to 125 psi for ¾" and 1" pipe sizes.

Pop Safety Valves

Prevent the build-up of dangerous, excessive pressures in air tanks. Valve automatically pops open at desired setting. Pipe sizes ⅛" through ½".





Low Flow Relief Valves

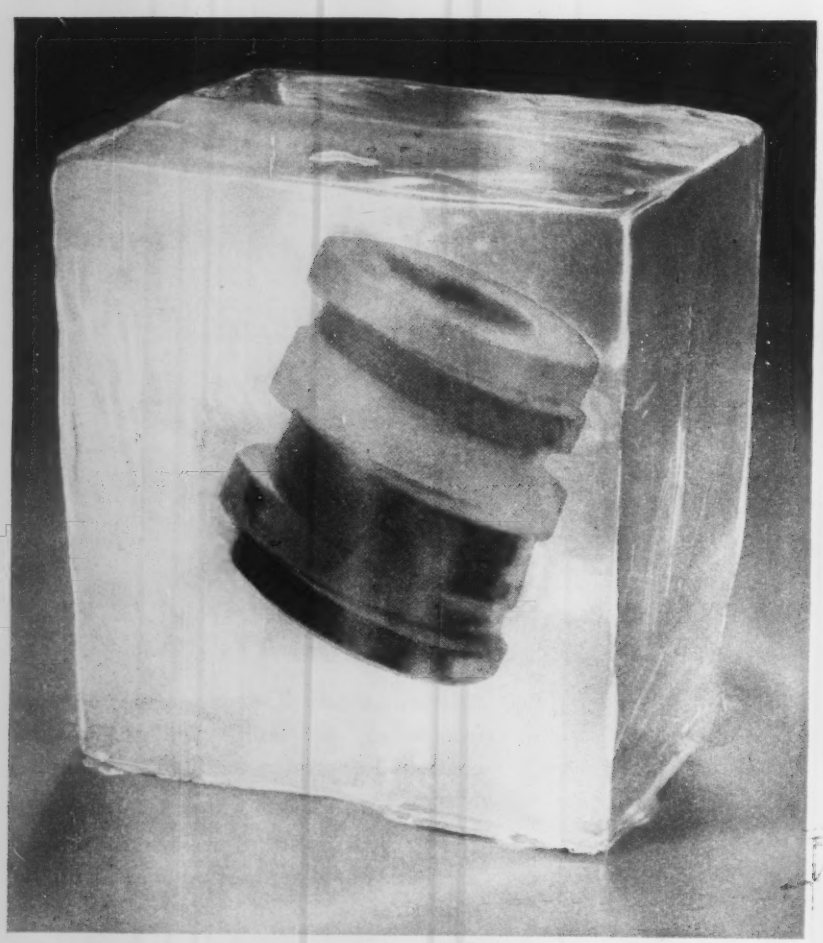
Small, inexpensive valves suited for a wide variety of uses requiring relief at low rates of flow. ⅛" and ¼" pipe sizes.

For complete information, call your nearby Norgren Representative listed in your telephone directory...
or WRITE THE FACTORY FOR NEW NO. 800 CATALOG.

Wherever Air is Used in Industry

C. A. NORGREN CO.

3412 SO. ELATI STREET • ENGLEWOOD, COLORADO



Tape that holds in freezing cold!

So cold-resistant, it holds at 40° below . . . so wet-proof, it transmits less moisture than even a wax-impregnated carton. "Scotch" Brand Acetate Fibre Tape is tough, long-aging, dimensionally stable; meets government packaging specification JAN-P-127. 12 colors: red, green, orange, blue, orange-yellow, light green, yellow, light blue, white, black, silver, and gold, plus transparent. Ask your "Scotch" Brand Tape distributor about acetate fibre tapes, or send for folder described below.

Always specify "Scotch" Brand, the *quality* tape . . . and stick with it!

ACETATE FIBRE TAPE ...*one of over 300 Pressure-Sensitive Tapes, trademarked...*

REG. U. S. PAT. OFF.

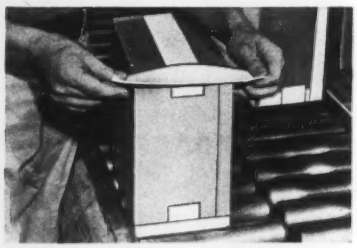
SCOTCH BRAND

The term "Scotch" is a registered trademark of Minnesota Mining and Manufacturing Company, St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

Look what you can do with it!

PACKAGE parts and products quickly, easily, with "Scotch" Brand Acetate Fibre Tape and Automatic Box Sealer S-70. Acetate fibre tape can be printed with sales message, if desired.

CLOSE cartons to be kept under refrigeration. "Scotch" Brand Acetate Fibre Tape No. 710 resists moisture and temperature changes; aggressive adhesive holds even at below freezing.



SEAL cartons against moisture with "Scotch" Acetate Fibre Tape No. 710. Adheres quickly and securely; forms a strong seal that resists abrasion and scuffing.

SEND FOR free folder describing remarkable physical properties of "Scotch" Brand Acetate Fibre Tape and giving valuable use suggestions. Write on your letterhead to "3M" Co., St. Paul 6, Minn., Dept. GK-67.

PRODUCT OF 3M COMPANY RESEARCH

Shells are automatically ejected

NEW USE . . .

sand—from the railroad cars to the completed shell—is completely automatic. The material (AFS fineness 55-60) is received in covered hopper gondola cars on a siding adjacent to the foundry. It is shipped screened and dried.

Sand is discharged into a track hopper and carried into the building by an 18-in. wide belt conveyor under the foundry floor. A centrifugal discharge bucket elevator lifts it 53 ft above the floor and discharges it onto a vibrating screen.

The material is brought to storage by a belt conveyor mounted above a two-compartment storage bin. One compartment has a capacity of 100 tons, the other of 50 tons.

Flexibility — The two-compartment bin is one of several provisions made to handle two sands.

The bottom of each compartment has a measuring hopper which discharges a predetermined amount of sand into a muller.

Mixing — Resin and iron oxide are moved from storage hoppers by screw conveyors to automatic scales. A rotary vane feeder discharges them into the muller.

An alcohol-water solvent is added to the muller for the cold coating of the sand mix. This automatic operation has an output of 2000 to 2500 lb an hour.

After the sand is discharged from the muller, it is conveyed pneumatically to a surge hopper at the shell molding machine.

Molding—The machine consists of sand-resin handling equipment, four pattern frames with built-in

(*Please turn to page* 192)

FORGING!

PHOTO - COURTESY CLEVELAND WORM AND GEAR CO.

The part illustrated above *will* become a component of the completed product — will *not* become a reject — BECAUSE IT IS A FORGING.

You get effective machinability because forgings are dense, homogenous metal, free of porosity and other flaws. Forgings start with *forging quality metal* which is improved by the forging process. This fact also offers advantages in heat treating and welding.

If you are experiencing a costly reject rate, find out how *forgings will help you.* Call in a forging engineer, and also send for the booklets offered below to learn the economies that can be gained by the use of forgings in your product.

Reduce your cost by using forgings. Send for booklets, ☐ "What is a Forging?" and ☐ "Management Guide to the Use of Forgings."

closed-die **forgings** for metal you can trust

DROP FORGING ASSOCIATION

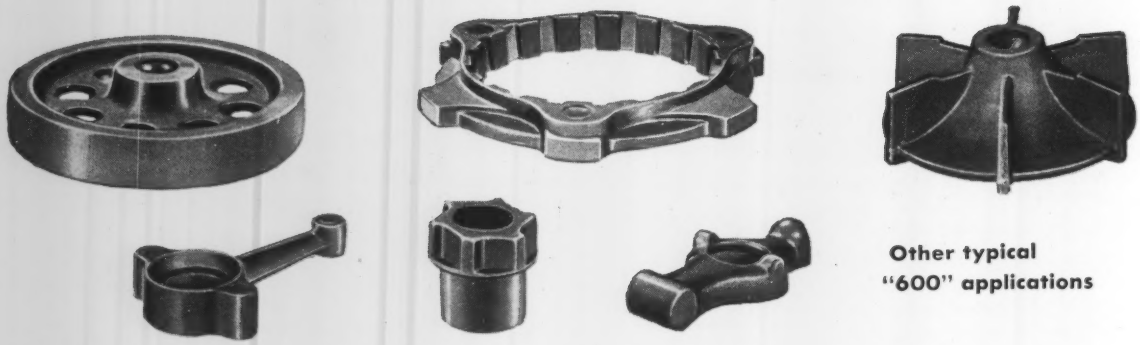
Dept. S, 419 S. Walnut St., Lansing, Mich.

Symbolic emble of the Dr Forging Associati

MUELLER BRASS CO. 600 SERIES BRONZE

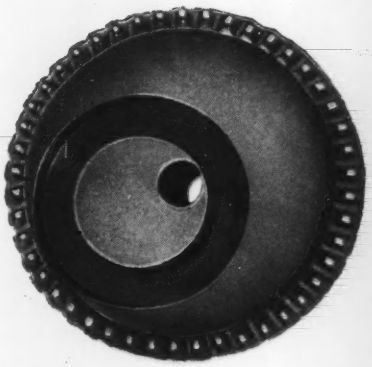
the main working part in the smooth and OCEAN CITY SPINNING REELS

600 Series gears prove ideal in heavy duty salt water models 300, R300, and 320 in which corrosion resistance and high strength are important.



Other typical "600" applications

FORGED GEAR powerful



The Montague-Ocean City Rod & Reel Co. of Philadelphia is proud of the fact that many fishermen are calling their famous Ocean City "300" series spinning reels "the most dependable spinning reels in America." Such praise justifies the very best components in a product—like the corrosion-resistant Mueller Brass Co. "600" alloy gear. Provides its own shaft and has an integral clutch which takes the driving force from the handle, and incorporates a cam which provides the oscillating motion of the spool for cross-winding the line. Bronze was chosen because of the need for maximum strength, long wear, and because it is such an excellent bearing material. This application dramatically points up the valuable properties of Mueller "600" series alloys.

There are countless applications of Mueller "600" series bearing alloys. Find out how you can utilize one or more of them in YOUR products. Because forgings can be made closer to the finish size in "600" series alloys than can sand castings, there is less waste, greater speed in finishing.

• WRITE TODAY FOR THE ENGINEERING MANUAL YOU NEED

Mueller Brass Co. Forgings
Engineering Manual H-58565 ☐

Tuf Stuf Aluminum Bronze Alloys
Engineering Manual H-58563 ☐

600 Series Bearing Alloys
Engineering Manual FM-3000 ☐

Copper Base Alloys in Rod Form
Engineering Manual FM-3010 ☐

METALS AND ALLOY REVIEW

by FRANK M. LEVY

Vice-President and Director of Research

Recently Ray Engelgau, who heads our statistical quality control procedures, and Amos Armitage from our machining department met in my office and we had a very interesting discussion on our new "S-C" rod. The term "S-C" is derived from the fact that it is produced from billets that are cast semi-continuously. In addition, we use the letters "S-C" to indicate its "super cutting" qualities which is one of the outstanding characteristics of this rod. We have definitely proved these qualities in some very exhaustive tests, one of which I'd like to tell you about here.

Experience has shown that it is difficult to control dimensions within close tolerances on machine parts involving internal forming operations. Amos had run into exactly that trouble with a certain hydraulic fitting made from rod that required a fairly close dimensional tolerance on the internal formed diameter. So, we decided to make a comparison test by machining the part from rod made by the conventional method and from rod produced by the S-C process. When rod made by the conventional method was machined, the parts could not be held within the specified tolerance range. The same machine, the same tooling and the same machine operator were used in this test, and when S-C process rod was substituted, the machine parts were well within the required tolerance range.

In addition, I just received a letter from a well-known equipment manufacturer who has been running tests on S-C rod. They reported that the incidence of tool trouble per 1000 forgings machined from S-C rod were approximately half that of forgings made from conventional rod. We think that is pretty good evidence that the rod made by our semi-continuous process is exceptionally uniform by all standards. Incidentally, our new billet casting department is quite a model of automation and has a number of interesting processes and features. Anytime you happen to be in our area we would be more than happy to show you through and explain the many points of this process that gives us what we firmly believe to be the best possible rod available today which of course is reflected in the quality of our forgings.

If you would like a folder that fully covers our semi-continuous process, just drop me a note and I'll see that one is sent along to you promptly. In the meantime, we'd like to have you investigate our super-cutting S-C rod because we think it will improve your product quality—and we've got the alloys to do most anything to meet the most exacting demands.

Thanks for your time.

MUELLER BRASS CO.

PORT HURON 26, MICHIGAN

199

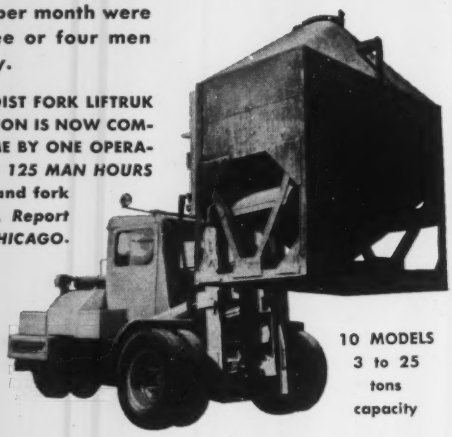
SILENT HOIST LIFTRUK

INLAND STEEL IS SAVING approx. 125 MAN HOURS EACH MONTH on JUST ONE SPECIFIC REQUIREMENT

"Four to six cars of carbide per month were formerly unloaded by three or four men working eight hours per day.

"THROUGH THE USE OF SILENT HOIST FORK LIFTRUK Model FK 7½, THIS SAME OPERATION IS NOW COMPLETED IN A PORTION OF THE TIME BY ONE OPERATOR . . . SAVING APPROXIMATELY 125 MAN HOURS PER MONTH" . . . releasing men and fork truck for other useful purposes. Report from INLAND STEEL CO. EAST CHICAGO.

SILENT HOIST LIFTRUK is a real work horse — operates long periods without maintenance — on muddy or irregular terrain. STANDARD EQUIPMENT includes Fluid Drive, Power Steering, High Undercarriage, extra large torque multiplier for traction.



10 MODELS 3 to 25 tons capacity

Ask for Bulletin No. 77.

SILENT HOIST & CRANE CO.
Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
849 63rd Street, Brooklyn 20, N. Y.

Sale of Diesel-Electric Locomotives

under

New York, Ontario and Western Railway Equipment Trusts of 1945 and 1947

June 25, 1957

Pursuant to an order of the United States District Court for the Southern District of New York, filed in the office of the Clerk of said Court on May 13, 1957, in the cause entitled *United States of America v. Louis D. Freeman, Trustee, etc., et al.* (Civil Action 116-204), the undersigned will sell at public sale at the United States Court House, Foley Square, New York City, on June 25, 1957, at 10:00 o'clock in the forenoon, Eastern Daylight Saving Time, or at such later hour and day to which such sale may be adjourned, the property in said order described and therein authorized to be sold, to which order reference is made for the terms of sale and for a description of said property, which consists of diesel-electric locomotives built by General Motors Corporation and covered by the above described Equipment Trusts, as follows:

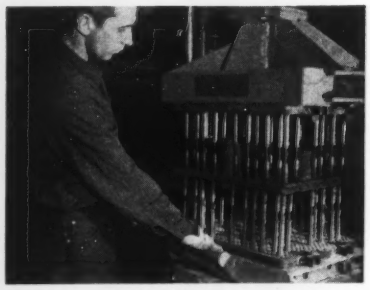
9 2,700 h.p. freight locomotives each consisting of 2 units of 1,350 h.p.;
7 1,500 h.p. freight locomotives each consisting of 1 unit; and
21 1,000 h.p. switching locomotives.

Said freight locomotives are presently located at the New York, Ontario and Western Railway Middletown yard at Middletown, N. Y., and said switching locomotives are presently located at the New York Central Railroad Selkirk yard at Selkirk, N. Y.

Copies of the required Form of Bid, together with the Invitation to Bid and said order, may be obtained from, and arrangements for the inspection of said locomotives prior to sale may be made with, The Hanover Bank (Mr. J. T. Harrigan, Senior Vice President), 70 Broadway, New York 15, N. Y., or Jacob Grumet and James B. Kilsheimer, III, Receivers of the property of New York, Ontario and Western Railway Company, 39 Broadway, New York, N. Y.

THE HANOVER BANK,
Trustee of said Equipment Trusts.

Dated, May 15, 1957.



Adhesive is applied at closing machine

NEW USE . . .

(*Concluded from page* 189)

heating elements carried by a turntable and a sand-resin investment station.

When the machine is operating on a fully automatic cycle, it produces 120 shells, 19½ x 29½-in., an hour. Each shell includes cope and drag halves which are closed to form a 14¾ x 19½-in. mold.

At the start of the molding cycle, the heated pattern moves to the investment station where a flask is lowered onto it. The flask is filled with a measured amount of resin-coated sand, part of which adheres to the pattern and forms a thin plastic shell. (The flask is water-jacketed to prevent the mix from building up around the outside edges.)

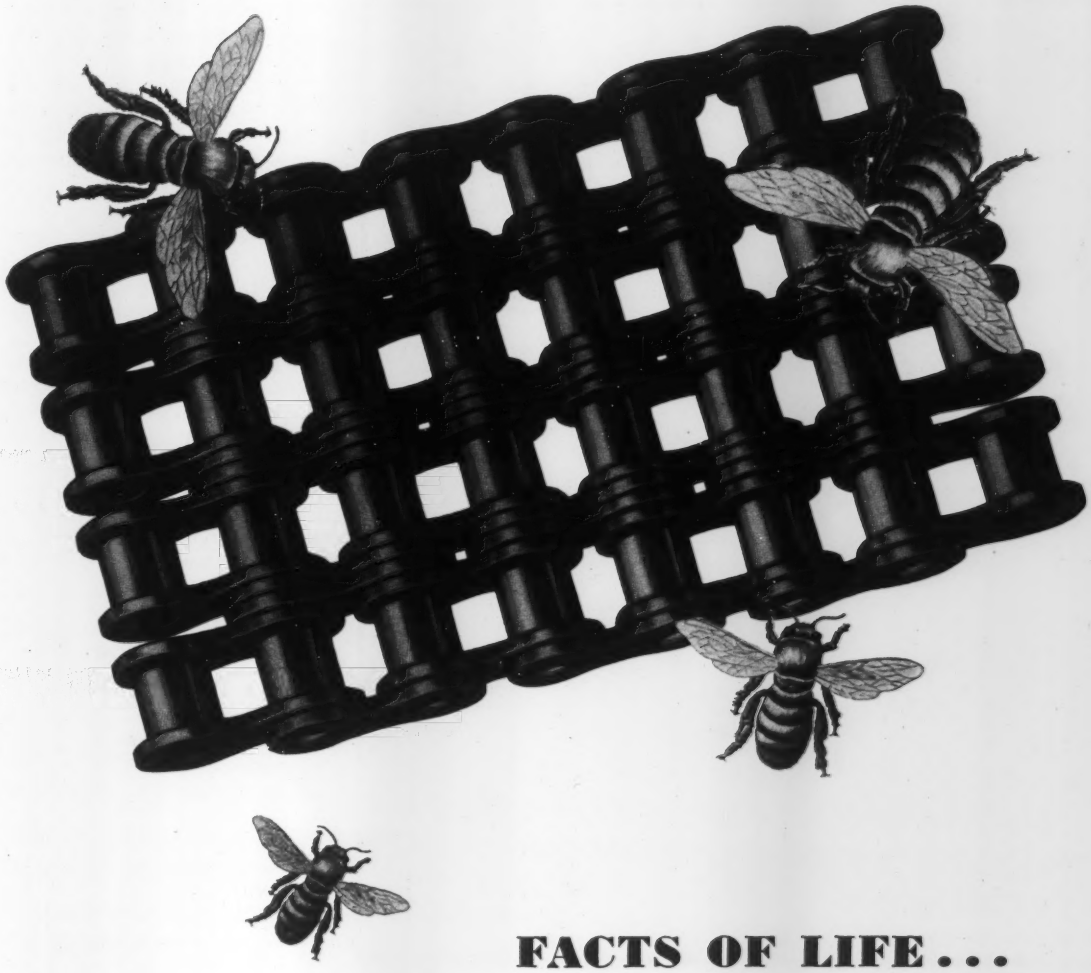
After the sand and resin are bonded, the pattern and flask are rolled over to discharge excess mix. The next stops are two successive curing stations where the shell is baked under electric heaters.

The drag half of the finished shell is placed on a flat belt conveyor for core setting; then it goes to the closing machine where it meets a cope half transferred directly from the molding machine.

A variable speed drive synchronizes the closing machine with the molding machine.

Pouring — When molds are removed from the closing machine, they are placed on a storage conveyor which has a capacity of 832 molds.

After inspection, molds are transferred to a pouring conveyor which is 152 ft long and moves at 8 to 24 fpm. It has 57 hinged trays which are filled with about 1½-in. of backing sand to support the molds during pouring.



FACTS OF LIFE . . .

Facts which concern the designer of modern equipment are top efficiency, adaptability and minimum over-all cost.

Whitney's Self-Lubricating Single and Double Pitch Roller Chain and *fatigue resistant* Processed Roller Chain are design advancements answering these needs for machinery manufacturers and users in many industries.

First, Whitney's amazing Self-Lube Chain outlasts regular chain by as much as 5 to 1 under toughest field conditions of continuous exposure to dust and moisture. Here, Whitney's exclusive sintered steel chain bushings "oil cleanly from the inside" . . . are prelubricated for life, cannot trap abrasive matter that cuts chain life. Ideal for applications in food, drug, textile and many industries where external chain lubrication is not practical or desirable.

Whitney's exclusive *fatigue resistant* Processed Roller Chain is establishing new service standards for durability, particularly on problem drives involving unusual operational conditions, stresses and heavy shock loads. This performance comes from the exclusive Whitney *fatigue resistant* process which offsets excessive operational stresses in the chain.

These new dynamic, balanced chain designs serve better, longer and at less over-all cost. And so does the entire Whitney line of A.S.A. Roller, Silent and Conveyor Chain Drives . . . all precision engineered for top quality.

Whitney Field Engineers provide nation-wide consultant service, backed up by company operated warehouses and alert Whitney Distributors offering a complete off-the-shelf stock service. If you want RESULTS specify WHITNEY CHAIN.

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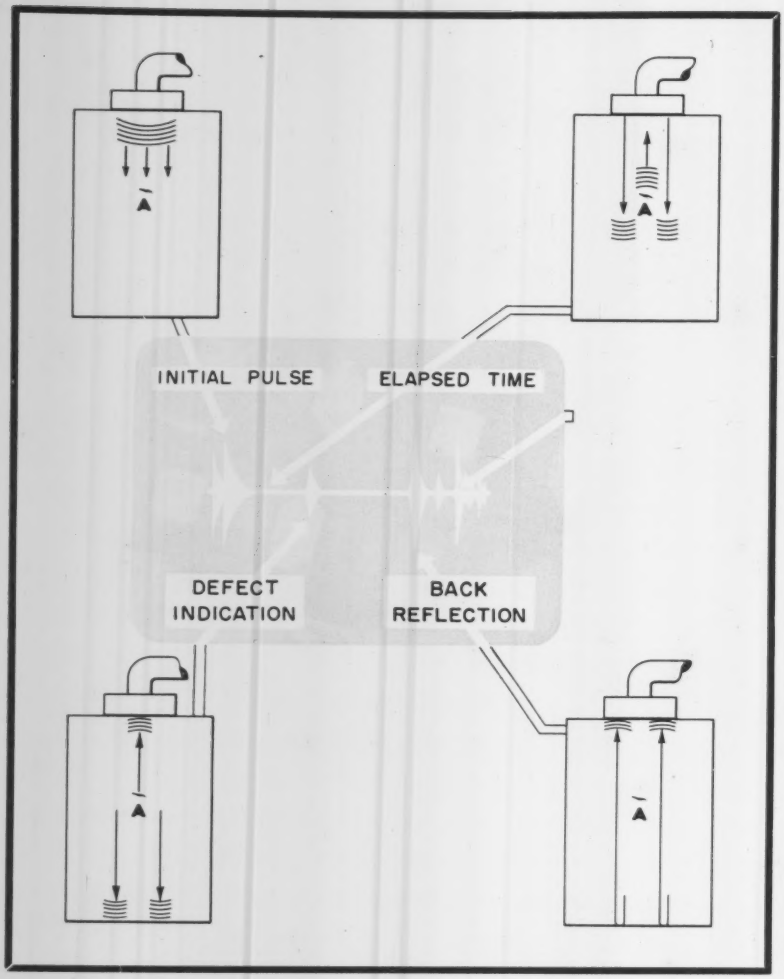


Here's how an ultrasonic pulse shows up defects

Reveals Test Procedures . . . for Atomic Products

Declassified information was discussed by Chicago symposium headed up by Warren J. McGonnagle, Argonne National Laboratory. STEEL asked him to prepare this report

IF you plan to make equipment for atomic reactors, nondestructive testing will be the key to your success.

That was the theme of a symposium in Chicago which was sponsored by the American Institute of Chemical Engineers, nuclear division; American Nuclear Society; American Society for Testing Materials; the Atomic Industrial Forum; and the Society for Nondestructive Testing.

The meeting was made possible by a recent AEC decision to declassify vital testing information as rapidly as possible. In addition to the nuclear industry, the information is important to manufacturers of consumer items like refrigerators, air conditioners and temperature controllers.

Here is a summary of the session.

Types—The kind of quality needed to minimize the possibility of failure calls for unusually thorough testing methods. These are currently in use: Ultrasonic transmission, helium leak, penetrants, radiography, electrical resistance, eddy current and several visual methods, some of which employ light sensitive devices.

METHODS

Visual inspection is the most widely used of all nondestructive tests. The specimen is illuminated and examined by eye or light-sensitive devices.

The human eye has excellent perception, but its sensitivity decreases rapidly as illumination decreases. Adequate lighting is essential. Eye fatigue is accelerated by glare and dim light. For observation at low light levels, the eye should be dark-adapted. Inspection time should be limited to avoid errors.

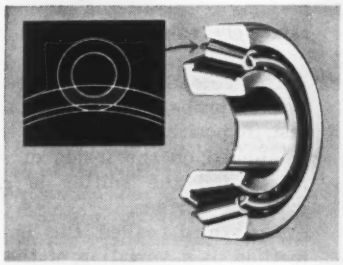
One of the first nondestructive tests for the bonding of fuel elements used heat. The element was coated with a temperature sensitive chemical and heated by induction. An unbonded area or a flaw is an area of poor heat transfer. If the heat is adjusted properly, the coating will melt on the poorly bonded areas.

ULTRASONIC

Ultrasonic transmission is more reliable. This technique requires a separate transmitting and receiving transducer. A pulsed ultrasonic wave is sent through a specimen placed between the transducers. Ultrasonic energy is not transmitted as well through a poor bond as through a good one.

The Argonne National Labora-

Tomorrow's "dream" is our job today!



HIGHER FLANGE IMPROVES ROLLER ALIGNMENT

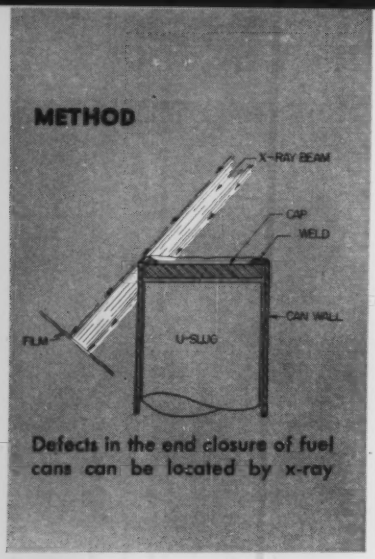
As shown by the gray area above, the higher flange provides a large two-zone contact area for the roller heads. This greatly reduces wear—practically eliminates "end play". Larger oil groove provides positive lubrication.

There's more to the car of tomorrow than just futuristic styling! Automotive engineers are working to perfect completely new power plants—like turbine engines—to achieve yet-unheard-of performance and economy! And they demand bearings that are as advanced as their thinking. This is no new challenge to Bower engineers. A glance at the design features listed at left will tell you a few of the many original Bower contributions to bearing performance which have reduced bearing maintenance and failure to a practical minimum. There are many more in the making. If your product is one which needs advanced bearings *today* plus realistic planning for the future, specify Bower. There's a complete line of tapered, straight and journal roller bearings for every field of transportation and industry.

BOWER ROLLER BEARING DIVISION
FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 14, MICHIGAN

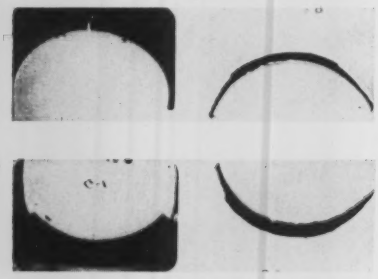
SPHER ROHED

BOWER ROLLER BEARINGS



Defects in the end closure of fuel cans can be located by x-ray

RESULTS



Top row shows: Porosity, inclusions; those in lower row: Lack of bond, porosity and inclusions

tory has built ultrasonic scanning and recording equipment. It uses an electrosensitive paper recorder which makes a permanent, two-dimensional record of the energy transmitted through a fuel element or component.

The Savannah River laboratory of E. I. du Pont de Nemours & Co. has simplified the equipment with barium titanate transducers, which eliminate a high voltage pulser and high gain amplifier.

You can locate unbonded areas which are as small as 1/32-in. in diameter.

Bounces—In the pulse echo technique, a pulsed ultrasonic beam is sent into the sample. The beam is reflected from the opposite side as well as from any discontinuity or defect. In the echo displayed on an oscilloscope, a defect can be recognized by its position.

A variation: The beam is projected into the sample at an oblique angle to the surface. It travels a zigzag path between top and bottom of the sample, and the echoes are picked up and interpreted as before. This technique is used to detect weld flaws in sheet material.

In the resonance test, a mechanically driven tuning condenser changes the frequency of an oscillator through its range. The oscillator drives a transducer. Momentary increases in the transducer current (which is measured) occur when the oscillator frequency coincides with the resonant frequency of the specimen.

The increase in energy is indicated on a cathode ray tube. A change in resonant frequency which cannot be accounted for as a change in thickness is usually an indication of a defect.

The technique has been used to locate lack of bond in roll-bonded material. It will not locate as small an unbonded area as the pulse echo or transmission technique and is used primarily to measure the thickness of sheets or tubing.

HELIUM

Used with a mass spectrometer, helium leak detectors are quite sensitive. Commercial instruments can detect less than 1 part helium in 2 million parts of air. The test is relatively simple and convenient. Application and interpretation of the results will depend on the skill and experience of the operator.

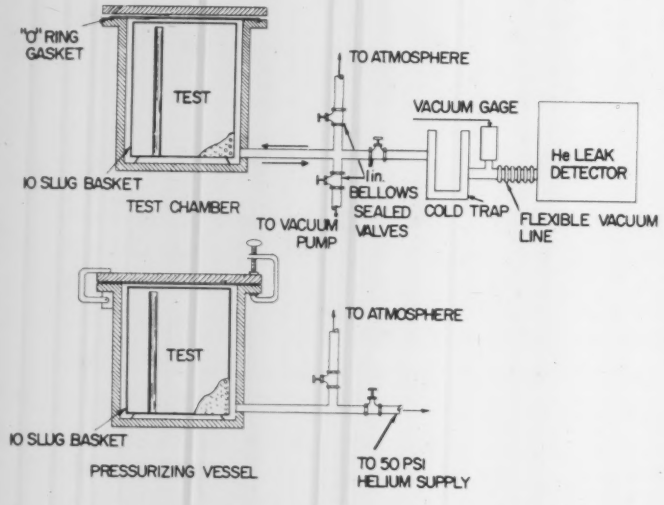
There are five ways to detect leaks.

The first involves a helium probe. A hollow specimen is evacuated and the outside surface is probed with a small stream of helium to locate the leaks. It is relatively easy to pinpoint small ones.

The second technique uses the reverse probe. It is called a sniffer test. A positive pressure of helium is applied on the inside of a test piece, and the sniffer is moved over the surface.

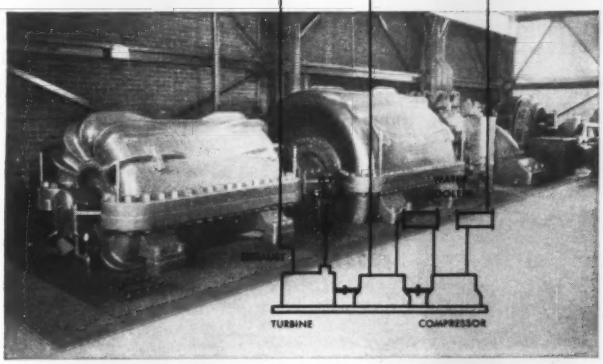
The third, called the envelope method, is a variation of the first. A sample is placed in a helium atmosphere and the specimen evacuated. It only determines whether the specimen leaks, not where it leaks.

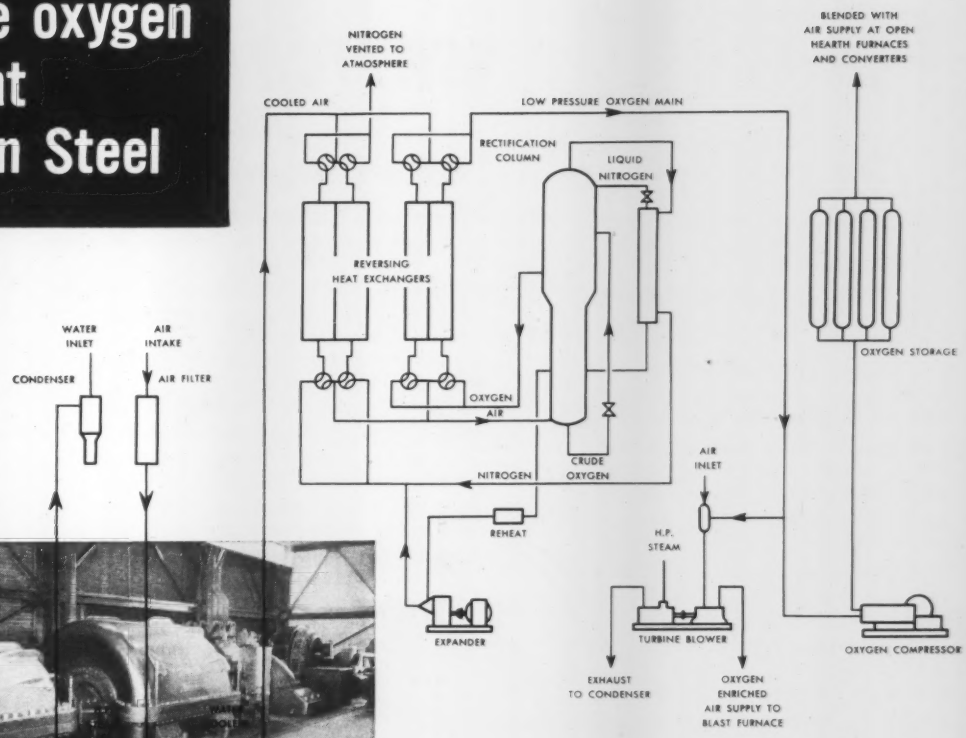
The fourth is the accumulation test. Helium is held within a test specimen which is in a glass chamber. With the chamber evacuated, helium leakage is allowed to accumulate for 5 minutes. A sample from the accumulation chamber is analyzed. This increases the sensitivity of the test, not the instru-



Typical helium leak test setup. Slugs are pressurized, then transferred to test chamber. Helium trapped in faulty slugs leaks in vacuum chamber and is detected by sensitive instruments

Tonnage oxygen at Weirton Steel





Ingersoll-Rand turbo-compressors cycle air in Weirton's 450-ton per day oxygen plant

"THE Weirton Steel Company Division of the National Steel Corporation started the operation of a tonnage oxygen plant in February 1951, and has operated this plant for the past *six* years making an average daily production of about *460* tons of oxygen for blast furnace and steel plant usage. During this *six*-year period the oxygen plant has produced *750,000* tons of 95 per cent purity oxygen, of which about *650,000* tons have been used for the enrichment of the blast for blast furnace iron production."

Julius H. Strassburger, Assistant Vice President, National Steel Corporation.

For the main air blower in this oxygen plant, which was designed and built by Air Products, Inc., an Ingersoll-Rand tandem turbo-compressor was selected. Pictured above is the high-pressure end of the compressor arrangement. The low-pressure unit delivers air at about 35 to 40 psig through a double intercooler to the second unit, where it is further compressed and discharged at pressures from 75- to 90-psig. The two compressors run in series and are driven by an Ingersoll-Rand steam turbine rated at 10,610 bhp at 3300 rpm.

Among the advantages of oxygen enrichment of the blast, according to Mr. Strassburger, are these: increased iron production with less "cost above Materials;" less flue dust per ton of iron; 25 to 50 lbs of coke saved per ton of iron; increased Btu of the top gas due to less nitrogen; no detrimental effect on furnace linings.

If you are interested in more complete details on the use of I-R turbo-compressors in tonnage oxygen production, contact your nearest Ingersoll-Rand engineer.

Ingersoll-Rand 12-600

11 Broadway, New York 4, N.Y.

PUMPS · COMPRESSORS · DIESEL ENGINES · AIR & ELECTRIC TOOLS · TURBO BLOWERS · CONDENSERS

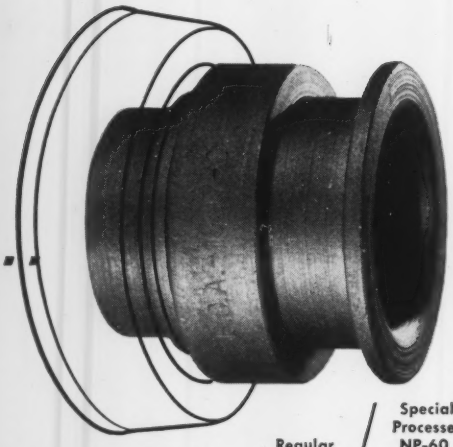
"SWITCH!" said Ostuco

. . . and savings were surprising!

Pleasant surprise, too! Bearings Company of America, Division of Federal-Mogul-Bower Bearings, Inc. Lancaster, Pa., was machining OSTUCO seamless tubing to make a clutch release bearing collar used as original and replacement equipment. Results were fine!

Then word came from OSTUCO, recommending a switch to OSTUCO's newly developed NP-60, tubing specially processed for machineability. Cost was slightly higher, but BCA and OSTUCO engineers predicted the savings would justify the change.

they switched . . .



. . . and they SAVED!

	Regular	Specially Processed NP-60
Production per 8 hour shift (units)	675	840
Production time per 1000 units (hours) . . .	12.35	10.03
Total Labor per 1000 units (man-hours) . .	13.09	10.63

Besides the savings, Bearings Company of America was pleased with the better finish of the new part. They point out that the collar in photo above "shows the finish as it comes directly off the machine."

It happens this way often enough to warrant checking with OSTUCO about your tubing applications and production problems. Contact your nearest OSTUCO Sales Engineer or write direct to the Shelby factory —there's no obligation!

OSTUCO TUBING

SEAMLESS AND ELECTRIC RESISTANCE
WELDED STEEL TUBING—Fabricating and Forging

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company • **SHELBY, OHIO**
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Why Reactor Parts Need Nondestructive Tests

A nuclear reactor is a device in which uranium and plutonium are fissioned. The products are heat and new fissionable materials. While a reactor operates, it emits neutrons and gamma rays which are absorbed by shielding.

Maintenance is difficult. For example, repairing a leak in a heat exchanger tube might require disconnecting the pipe by remote operations and decontaminating the heat exchanger after removal.

Need Protection—Most metals in reactors are chemically active (high in the electromotive series). Uranium and thorium react slowly with air and water at room temperatures but rapidly at high temperatures. Thorium reacts slightly less rapidly than uranium.

Fuel elements must be clad to prevent loss of fission products to the coolant (corrosion or erosion), to provide structural support for the fuel, to provide coolant passages and to keep the fuel from warping or the surface being roughened.

Cladding materials must meet these requirements: Low neutron absorption, good heat conductivity, reasonable tensile strength and creep resistance, excellent corrosion resistance. In addition, they must be easy to form and cling tightly to the fuel elements without voids.

These materials are used for cladding: Magnesium, aluminum, zirconium and their alloys. Stainless steel is used in a few applications. (Stainless steel, titanium, or tantalum may be used in fast reactors.)

The cladding is usually bonded to the core to obtain uniform heat transfer. Any unbonded area gets too hot and causes warping or other changes in the fuel. A warped fuel element might block a coolant channel or make it difficult to remove the fuel element or assembly. In water-cooled reactors, a good bond is also important in preventing oxidation of the fuel. Bonding material may also be an assurance of satisfactory welds in cladding.

Measurement—Many processes reduce cladding thickness through erosion, solution in the bonding material and the like. Cladding thickness must be measured. That is particularly important because the service life of the fuel element is predicted on minimum jacket thickness. Inspecting the cladding thickness of many fuel elements for small areas of reduced thickness demands high-speed inspection equipment.

The cladding of many fuel elements is welded. In most cases, weld quality is not measured by its strength but by its integrity: The ability to keep the coolant outside the cladding. Defects are quite small. There is no lower limit on the size of a defect. They simply must not exist.

There is no really perfect method of testing welds, although a combination of methods gives considerable assurance. As a result, many cladding procedures are secondary protection against imperfect welds. Frequent destructive tests for weld inspection by metallographic techniques are required to maintain weld quality.

Tubing for reactors or heat exchangers must be free of cracks, pinholes, pits, gouges, inclusions and alloy-constituent segregations. They must meet the usual commercial dimension and material specifications. Reactor service conditions are often severe and the consequences of a tube failure are costly and dangerous.

Piping also must be of high quality, although the weight of stainless steel piping makes minor imperfections of small consequence. Tubing for instruments should be carefully inspected.

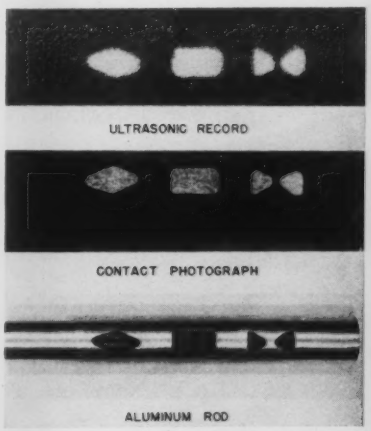
Steel plates for pressure vessels are visually inspected and samples are taken for chemical and physical analyses. After manufacture, the vessel is stress relieved, pressure tested and the welds x-rayed.

ment. One limitation: Openings must extend through the specimen wall.

Formula—By using calibrated leaks, you can estimate the leakage rate of an opening. Leaks are calibrated in terms of cubic centimeters per second at standard temperature and pressure. For example: A 15 psi pressure differential applied across a 10^{-6} calibrated leak takes six months to pass 1 cu in. of helium. Dirt, oil, scale and moisture may seal small holes, so clean test specimens thoroughly.

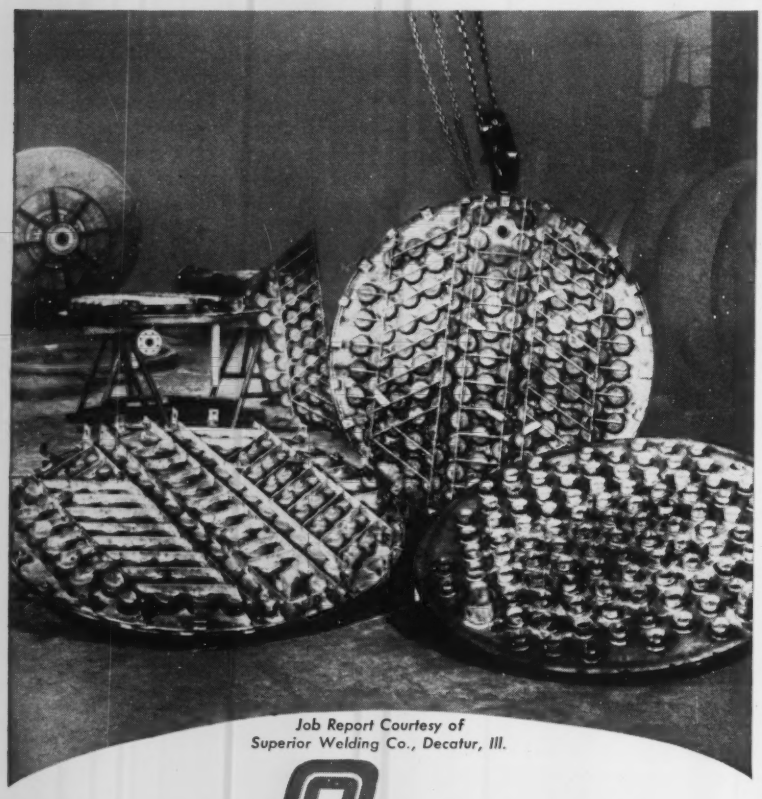
The fifth technique is used to detect minute defects, such as holes, cracks and fissures, in cladding and weld closures of fuel elements or similar objects. A test specimen is placed in a vessel and exposed to a pressurized helium atmosphere. The specimen is transferred to a second chamber connected to a vacuum pump and helium leak detector. The chamber is evacuated to about 150 microns, the throttle valve on the leak detector opened, and the amount of helium released read on the leak indicator.

You can detect a bad fuel element in a group of good ones. Dirt, oil and scale cause a large response but samples dipped in acid are sufficiently clean for testing. Large open cavities like those made by a machine tool aren't important because helium is not re-



Comparison of two electrosensitive methods of detecting defects near the surface. Aluminum rod is used to demonstrate clarity

When the *quality* of welded equipment is essential to performance



Job Report Courtesy of Superior Welding Co., Decatur, Ill.

WELD WITH ARCOS

STAINLESS ELECTRODES

Welded bubble cap trays, such as these, are used to refine petroleum, petro-chemicals, and food products. They—and the welds—are subjected to corrosion from the liquids and gases passing over them. High processing temperatures intensify the corrosive conditions. ARCOS Chromend KMo Electrodes (Type 316 with 2.5% molybdenum) were used because of their ability to resist acid conditions combined with heat. These electrodes—like all Arcos stainless filler metals—produce welds that are trouble-free both during welding and in service.
ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

TEST PROCEDURES . . .

tained long enough after the fuel element is removed from the pressurizing vessel.

PENETRANT INSPECTION

This method is being used in testing reactor components, especially tubing. It's quick, easily applied and detects discontinuities open to the surface. The method works on all metals.

Defects which it can locate include surface cracks, porosity, cold shuts, fatigue cracks, grinding and heat treat cracks, seams, forging laps, bursts, lack of bond between joined metals, through-leaks in welds and through-leaks in tubing.

The penetrant, a low surface tension, low viscosity liquid, is drawn into surface discontinuities by capillary action. Discontinuities are revealed by a developer, which acts like a blotter and draws the penetrant from the openings. There are two types: Dyes and fluorescents. Dyes give a red indication on a white background and can be observed with visible light. Fluorescents must be illuminated by ultraviolet light (black light-3600 units Angstrom). The appearance is greenish against a dark background.

Here is how it's used. Surfaces must be free of grease, oil, scale or other foreign materials which would clog surface openings. The penetrant is then applied. Time varies with the penetrant, material and type of defect.

When the emulsifier is applied, it reacts with the penetrant to make a water soluble mixture. It removes emulsifier and penetrant. Developer draws the penetrant from the discontinuities and spreads it on the surface for a short distance on each side of the defect.

Small pinholes in tubing and pipe can also be located. Such defects are more readily found by penetrants than by other types of inspection. Pinholes have been found with ultrasonic and eddy current techniques but require careful attention. Shallow gouges are not revealed if emulsifying time is too long since emulsifier washes the penetrant out. One disadvantage is that only the out-

side of small tubing can be inspected.

RADIOGRAPHY

Radiography is applied to a great variety of problems. Radiation from an x-ray tube or isotope passes through test specimens. Radiation intensity is modified by flaws and variations in density or thickness. The variations can be recorded by film, scintillation crystals or semiconductors.

The high density and atomic number of reactor materials makes radiography difficult. The density of zirconium is slightly lower than that of steel, but because of its high atomic number, zirconium has a higher absorption coefficient than steel. As in most other nondestructive tests for reactor fuel elements, high radiographic sensitivity is required—a further complication.

Location — Radiography can show the uranium in a clad fuel element, the width of the side and end clad, dissimilarities within uranium alloys, porosity, inclusions, lack of penetration and lack of fusion in closure welds and voids and inclusions in materials intended for fuel element use.

Two dissimilar materials can be detected because of a difference in absorption. For best sensitivity, use the softest radiation that gives the required penetration.

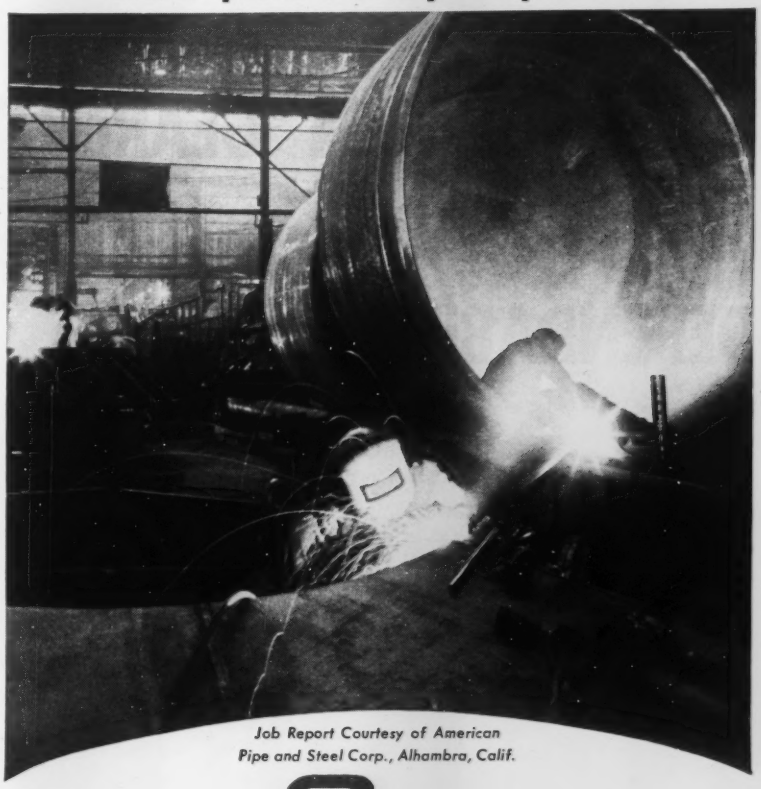
To locate small inconsistencies in nonhomogeneous material, use the maximum contrast obtainable. That is obtained by comparing the intensity of the x-ray beam transmitted through sections of equal thickness, one of which contains the defects.

For defects in closure welds, the region being radiographed often varies in thickness, especially on cylindrical fuel elements. A double film technique can be used to advantage. Fast film records the inner (thick) edge of the weld where the transmitted intensity is low. Slow film records the outer (thin) edge.

To determine sensitivity and resolution, specimens of the same size and shape as the pieces should be made. Holes of various sizes are

(*Please turn to page* 204)

When heavy chrome-moly welds must pass X-Ray Inspection



Job Report Courtesy of American Pipe and Steel Corp., Alhambra, Calif.

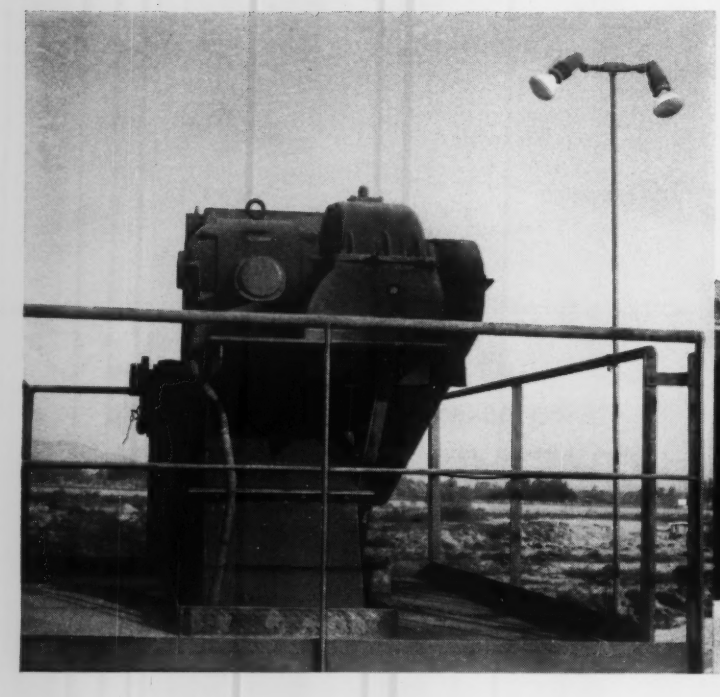
WELD WITH ARCOS

CHROME-MOLY ELECTRODES

In setting up this job—fabricating heavy alloy components of lead melting pots—new welding procedures were required to assure that all welds would pass x-ray inspection. With the help of Arcos Technical Service, both manual and submerged arc procedures were established and ARCOS Electrodes and Rods were used exclusively. The quality of Arcos weld metal consistently assures internally sound, flaw-free welds. And Arcos Technical Assistance prevented problems on what could have been a "tricky" job.
ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

MIXING NEARLY 2 MILLION TONS OF ASPHALT YEARLY . . .

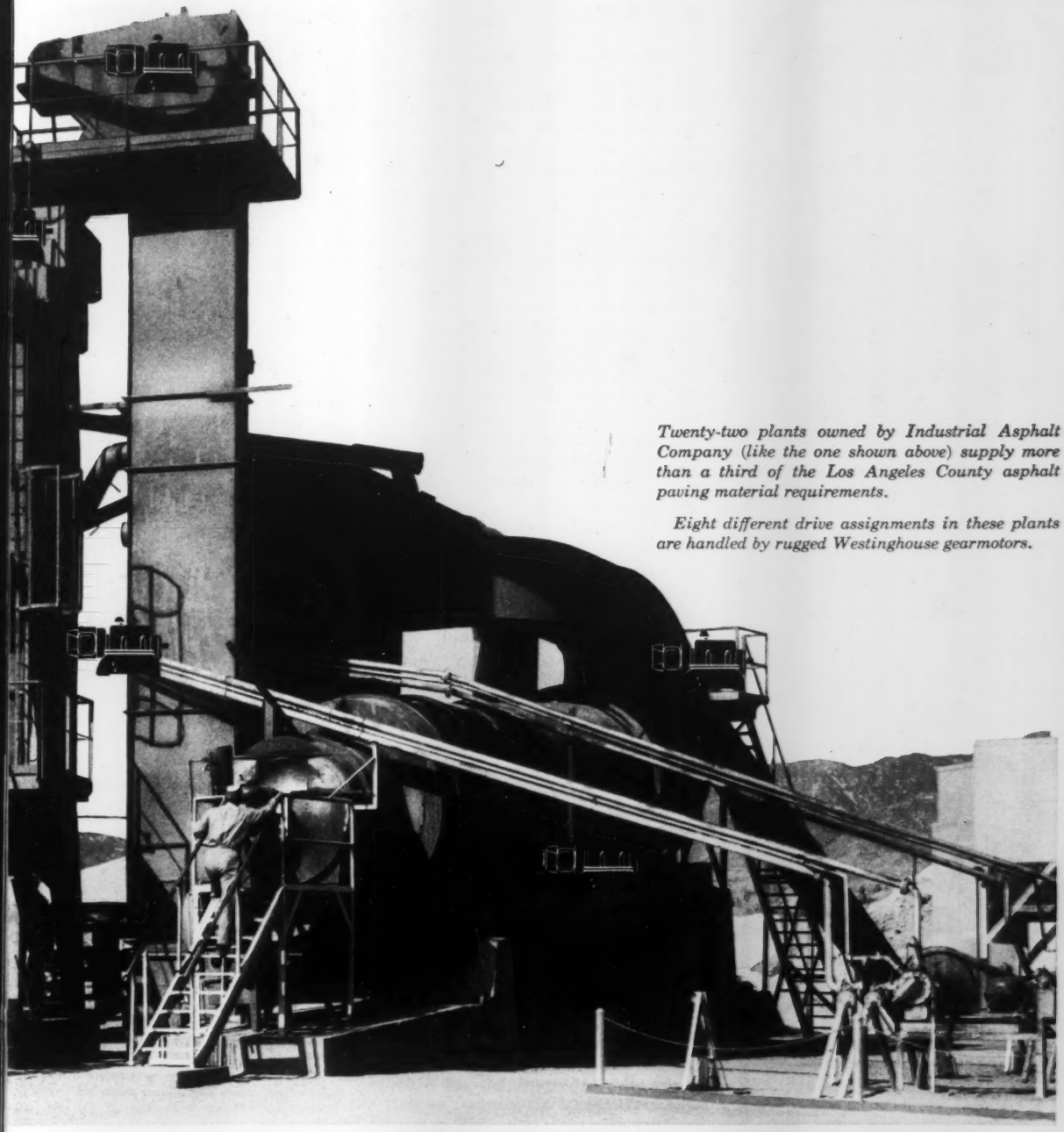
WESTINGHOUSE GEARMOTORS SET 15-YEAR DEPENDABILITY RECORD



Mounted on top of a 36-foot high aggregate elevator, this Westinghouse gearmotor moves 6600 lbs. of rock a minute from the ground to the vibrating screen. There has not been one failure in 15 years in either motor or gearing despite repeated high torque requirements and adverse weather conditions.

"We have used Westinghouse gearmotors in our plants for more than 15 years," reports E. J. Woodward, Chief Engineer of Industrial Asphalt, Los Angeles. "Gearmotors driving the hot elevators take the toughest strain. Most of these units have been operating 15 years without replacement or addition of new bearings or motor armature. These drives take occasional overloads safely, too. For example, we've increased output from 230 to 283 tons per hour without a failure."

"As a manufacturer of these asphalt plants, we demand absolute dependability in all components,"



Twenty-two plants owned by Industrial Asphalt Company (like the one shown above) supply more than a third of the Los Angeles County asphalt paving material requirements.

Eight different drive assignments in these plants are handled by rugged Westinghouse gearmotors.

remarked M. B. Preeman, of Standard Steel Corporation. "Dependable service is the primary reason for using Westinghouse gearmotors in Standard Steel asphalt plants."

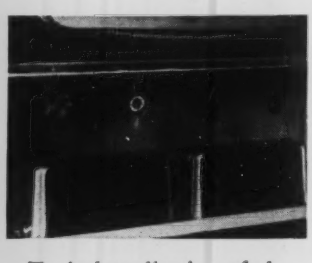
Here's another example of the type of service you can expect from Westinghouse gearmotors and speed reducers. You can get immediate delivery in horsepower ratings from 1 to 100; reduction ratios to 58.3:1. Call your local Westinghouse sales engineer, or write, Westinghouse Electric Corporation, Gearing Division, 200 McCandless Avenue, Pittsburgh, Pennsylvania. J-07355

YOU CAN BE SURE...IF IT'S

Westinghouse

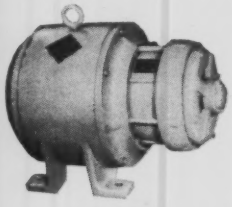
Clean Metal Parts

√ FASTER
√ BETTER
√ LESS COST



Typical application of ultrasonic cleaning using the new D-52 GU Sonicell. Operation completely removed shop dirt, grease, chips, and lapping compound from the insides and outsides of the roller bearings in just 28 seconds.

If you have a cleaning problem on metal parts from bearings to crankshafts General Ultrasonics can help you.



New 2KW Generator

For large ultrasonic applications, we are furnishing our new (non-electronic) 2KW motor-alternators. For tanks up to 100 gallons, the 2KW with simple push-button controls will power 6 of the D-52 Sonicells shown above.

For Details Write Dept. P-1.

GU **THE GENERAL ULTRASONICS CO.**

67 Mulberry Street
Hartford 3, Conn.

ULTIMATE IN ULTRASONICS

TEST PROCEDURES . . .

(*Continued from page* 201)

drilled in them. Some are filled with a lead oxide or similar paste; the others are left unfilled. They serve as voids and inclusions of known dimensions. With the two-film technique (a fast and slow film in the same cassette), one exposure shows the location of the fuel and the inconsistencies.

Integral Source—The natural radioactivity of uranium will inspect the finished fuel element. Its rays will sensitize an x-ray film. For plates, a film is placed on each side. For cylinders, one film is wrapped around the element. The film is covered by a thin sheet of lead which intensifies the image. It takes 8 to 16 hours to expose the film.

You can detect defects in the bond which are approximately 2 per cent of the thickness of the cladding, similar defects in the metal and centering of the uranium metal. The technique will show if the core is correctly placed in the clad and abnormally thin or thick regions in the core.

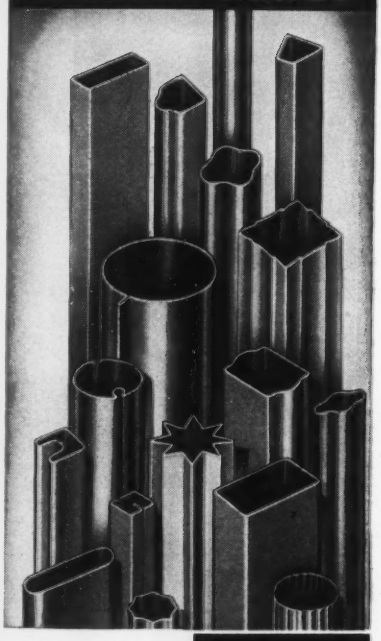
Here's how it works with a plate type fuel element.

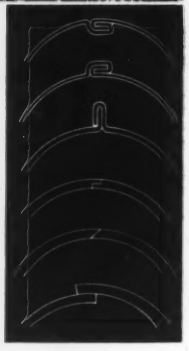
If the core is uniform but eccentrically displaced, the film will be darker on one side than the other. If the core is uniform and properly located, the film has a local light and dark area. If the core is eccentrically located and also has thin or thick local regions, local abnormalities will be noticed while the over-all film shows the eccentricity.

In addition to the gamma radiation, there is a beta ray emitted by protoactinium, a relative of U-238. Its radiation will measure the thickness of cladding. You can measure the radiation with a scintillation counter, sensitized for beta particles. Calibration curves show a 10 per cent change in counting rate per mil change in thickness of zirconium and stainless. Sensitivity decreases for thicknesses greater than 30 mils. For aluminum cladding, the sensitivity is about one-third that of zirconium and stainless steel.

Carrier Technique—Radiation from an x-ray tube or a gamma ray isotope can be used. The amount of radiation transmitted is

COLD ROLL FORMING TUBULAR SHAPES





Among the wide variety of things you can make on a Yoder Cold Roll Forming machine are round, square, oval, rectangular and other tubular shapes, such as illustrated. The seams may be open, lapped, butted, dovetailed, interlocking, etc.—as shown in the drawing.

Millions of feet of such unwelded tubular shapes are made from coiled strip for conductor pipe, bedsteads, lamp stands, window channel, wiring raceways, carrying rods, etc. Production ranges from 20,000 to 50,000 feet per day, with only one operator and a helper.

Yoder offers you the cooperation of their engineering staff for designing and adapting their cold roll forming machines, auxiliaries, and tooling, for the low cost production of structurals, mouldings and trim, panels, tubular and other shapes, to meet individual needs.

The Yoder Book on Cold Roll Forming is a complete, illustrated text on the art and the equipment needed for performing a variety of operations which can be combined with cold roll forming, at little or no extra labor cost. A copy is yours for the asking.

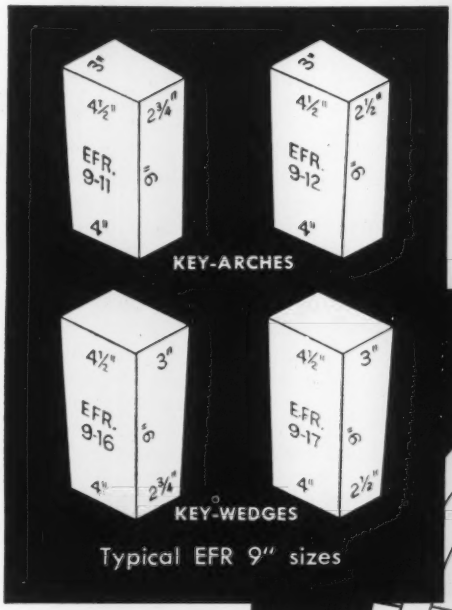
THE YODER COMPANY
5502 Walworth Ave. Cleveland 2, Ohio

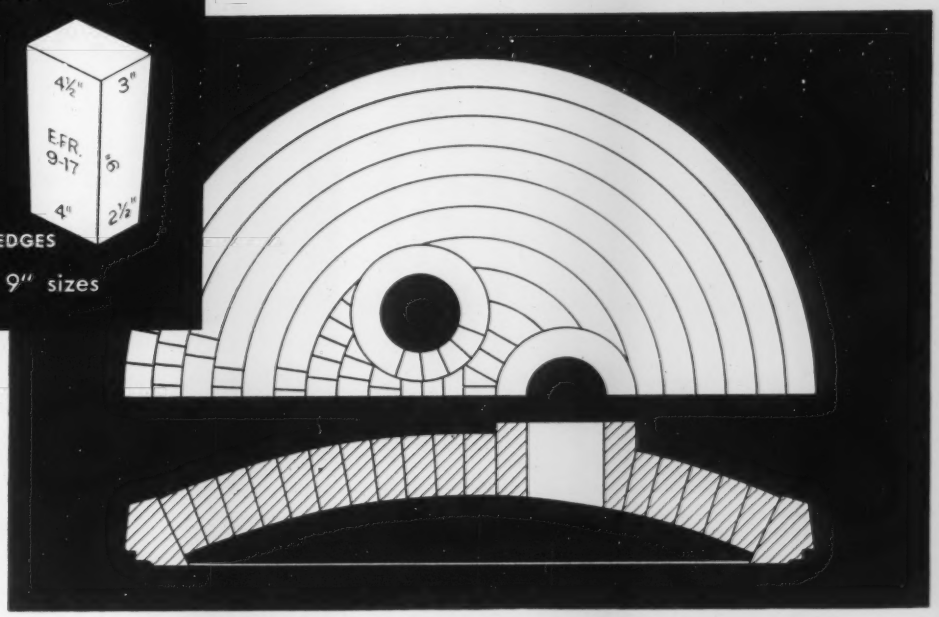
YODER ENGINEERING MANUFACTURING **COLD-ROLL FORMING MACHINES**

For electric furnace roofs

Harbison-Walker EFR design

provides important benefits





Harbison-Walker EFR (electric furnace roof) brick are modified 9″ key-arches and key-wedges, designed for use in combination with a large proportion of standard 9 x 4½ x 3″ sizes in the construction of roofs of any diameter and rise.

The use of these EFR shapes insures a close fit of the brick and roof construction of best workmanship.

The number of different sizes required for building a roof with the aid of the EFR brick is greatly reduced for some designs.

Bricklaying is simplified and much time is saved when EFR brick are used.

EFR brick are power pressed by which method of forming all of the most desirable physical properties are secured.

Roofs built of smaller brick units in preference to large special shapes generally prove to be more serviceable. The smaller sizes are more resistant to thermal shock.

The EFR shapes cost less than large special shapes and since they are used with standard 9″ sizes in predominance, the overall cost is considerably reduced.

H-W High Alumina Castable and Korundal Ramming Mix sometimes are used to advantage as a monolith to facilitate easy fitting in the center section.

The EFR brick, together with the standard 9″ sizes needed for complete roofs, are furnished in the types and classes of refractories best suited for the various operating conditions. For example, they are made in the following brands: STAR and VEGA silica brick; H-W MULLITE; KORUNDAL; and various Harbison-Walker superduty brands, such as ALAMO and H-W SUPER SAVAGE.

The combination of quality, H-W Technical Service and balanced selection based on availability of all types and classes of refractories from one source, provides maximum economy.

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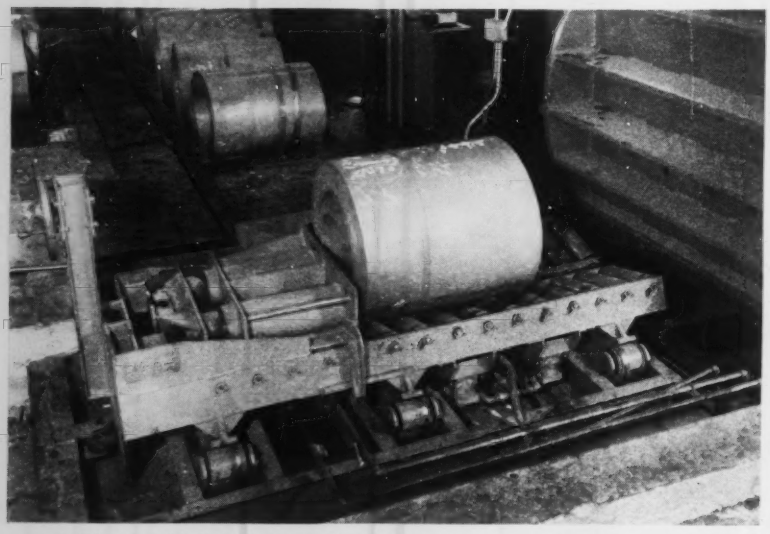

In this system side tilter discharges coils on to pallet conveyer which leads to processing or coil storage. Down ender in right foreground has returned to receive position.

Most plant operating people, when they buy conveying systems, are looking for the equipment that is best for **their** plant—equipment that is designed to meet their individual requirements. They are looking beyond the price . . . looking to quality—to dependability. Mathews engineers have been designing and building conveying systems for over 50 years, and a great amount of this equipment has been applied in metalworking plants. This is why operating people everywhere have an extra measure of confidence in Mathews equipment—and why you see Mathews Conveyers in metal-producing and fabricating plants everywhere.

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TEST PROCEDURES . . .

the product of material density and specimen thickness. If one factor can be held constant, the other may be measured quite accurately.

If isotopes are used, either high intensity or long exposure is required. For example, a parallel beam of thulium-170 radiation and a sodium-iodide scintillation counter indicate the real density of uranium and aluminum alloy on a recorder trace. The deviation of the trace is proportional to the real density in the fuel element.

Radioactive isotopes like cobalt-60, iridium-192, thulium-170, and cesium-137 are good sources.

One paper at the Chicago symposium reported on the fine tungsten wire as a line radiation source.

Tungsten-185 was prepared by neutron activation. It was used to locate the edge of the core alloy and defects in the core of the fuel assemblies.

Cesium-137, which is separated from fission products, is a versatile source and covers the energy range between that of iridium-192 and cobalt-60.

ELECTRICAL RESISTANCE

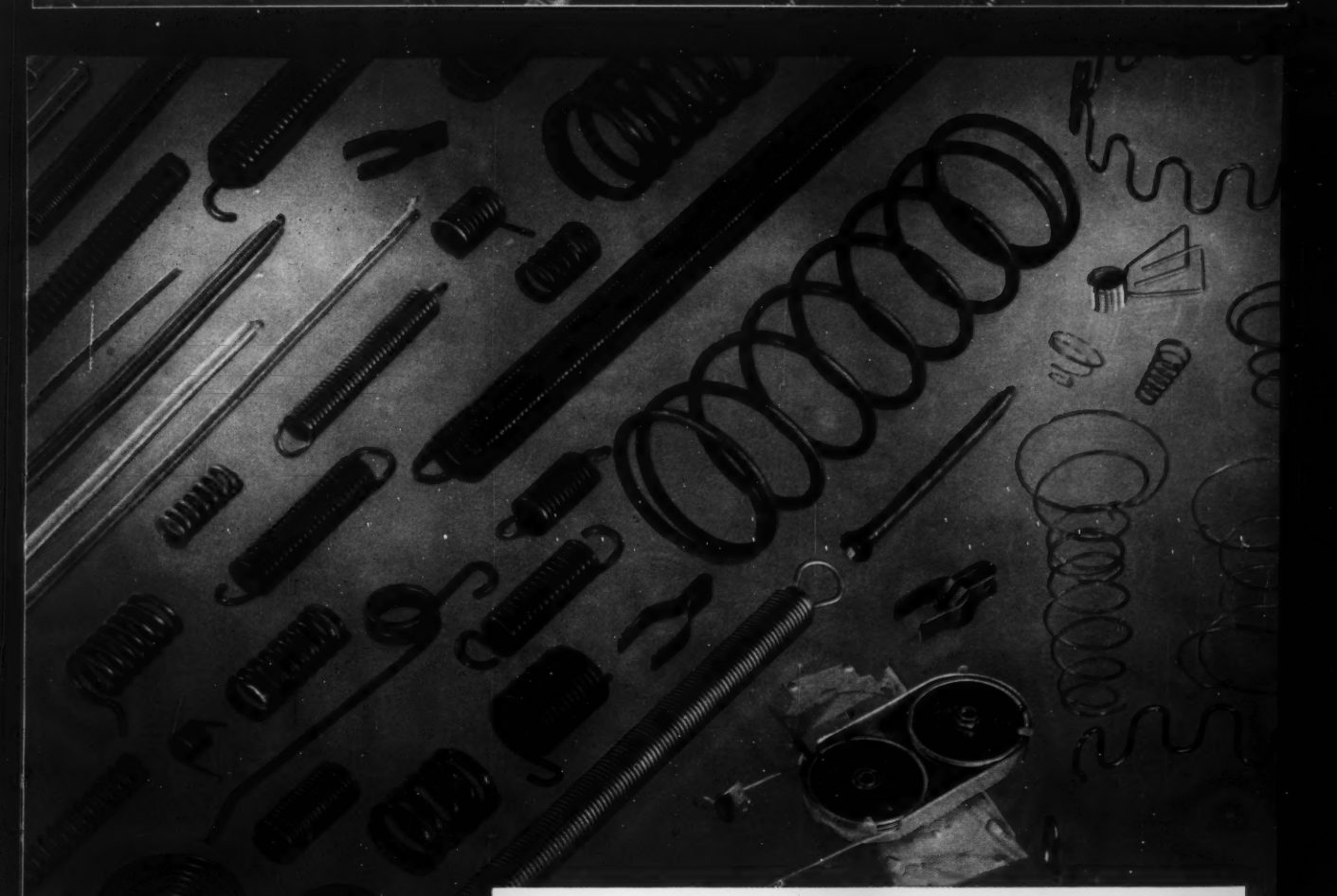
Such methods are based on the principle that the resistivity next to a defect differs from that of solid metal. In a sample of uniform dimensions, there is a fixed difference in electrical potential between any two points. A defect increases the potential.

Clean metal surfaces and pressure contacts are required to avoid overheating or burning of the sample. Contact resistance may cause a greater variation in potential difference than the presence of a defect.

Special electrodes reduce the disturbing effect of surface contact resistance. With such electrodes, you can detect laminations and cracks and differentiate metal-to-metal bonds from fusion bonds in fuel elements.

EDDY CURRENTS

When an alternating current coil is brought near a metal specimen, eddy currents are induced in the metal. The size of such cur-



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Industrial and Agricultural Department

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L. E. WARD, JR., *Manager*

FILE NO: S-762

Mr. Steel Executive
U. S. A.

Dear Sir:

This is to call your attention to an opportunity about which you should want full details.

In the territory served by the Norfolk and Western, there is a location where a steel mill can operate with premium advantages.

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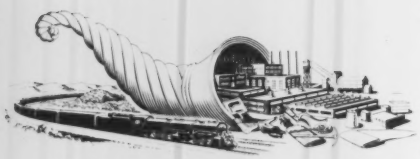
A steel mill producing at this location would begin operation with a market for over one million tons of steel per year -- a market which would be virtually captive to that mill because of its nearness to specific markets. The figure of one million tons is a minimum figure.

We believe that a steel mill will go up in this territory -- either now or later -- because the way it meets steel's requirements is too compelling for an expanding industry to pass by.

You should have the complete story, and we would like to tell it to you in detail.

Sincerely yours,

L. E. Ward, Jr., Manager



THE *Land of Plenty* — THE SIX GREAT STATES SERVED BY THE NORFOLK AND WESTERN
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rents depends upon the size and frequency of the alternating current, the magnetic permeability of the specimen, the conductivity of the specimen and its position relative to the coil.

The electrical and geometrical properties of the coil also influence the size of the eddy currents. They are concentrated near the surface of the specimen. In the case of a plane conductor, the current decreases below the surface.

Defect Effects—Eddy currents in the metal set up a magnetic field which opposes the original one. The impedance of the exciting coil or any pickup coils close to the sample is affected by the eddy currents in the metal. If the path of the eddy currents is distorted, the apparent impedance of the coil is different. The change can be measured. It indicates defects or differences in physical structure of the test piece.

The impedance change that occurs when a coil is held near a conductor is complicated by many variables. Through analysis it is possible to separate some of them. The changes occur in both amplitude and phase. A plot showing such variations is known as the impedance diagram.

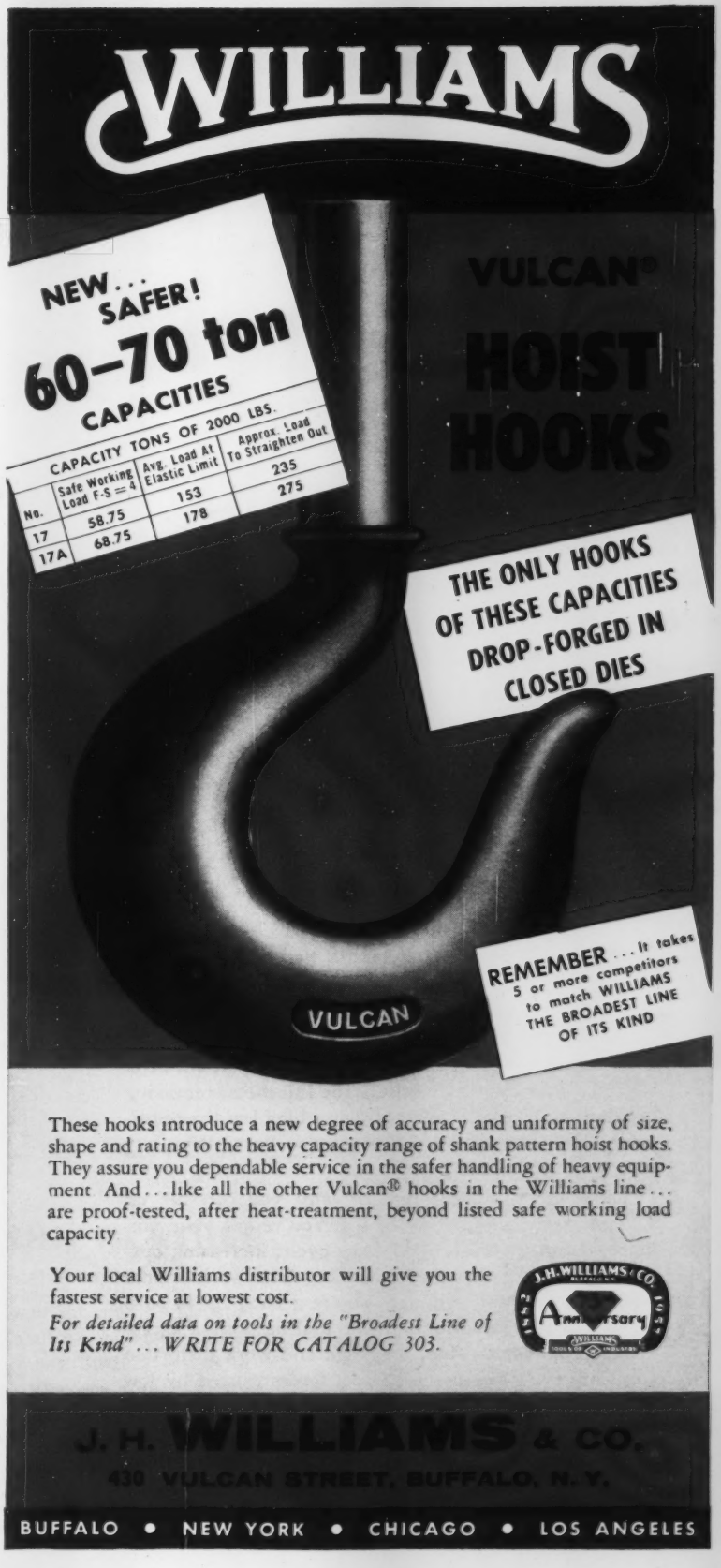
Two types of coils can be used: A concentric pickup or a point probe. The concentric type encircles the sample and examines an area about equal to that of the probe. The design and frequency of the coils must be varied. They can be either resonant or driven.

Buying—There are a number of eddy current instruments. One, called a cyclograph, will examine bare uranium rods with naturally occurring cracks, seams and porous areas.

Cracks in uranium are detected at a frequency of around 6.5 kc. In addition, barely discernible separations and subsurface cracks give indications that are comparable to those obtained from large cracks. The cyclograph also inspects small diameter tubing and indicates radial cracks, intergranual attack 1 to 2 mils deep on the inner surface, foreign metal particles and dimensional variations.

The Probolog is another type. It

(*Please turn to page* 212)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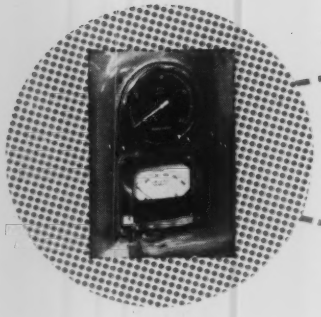

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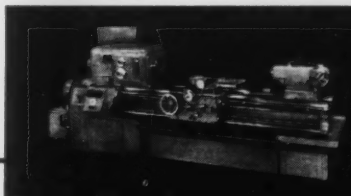
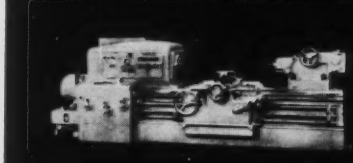


Monarch Series 62 Preselector Dyna-Shift



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Monarch Series 90 Heavy Duty Dyna-Shift

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TEST PROCEDURES . . .

is an impedance bridge which compares the signal from two coils inspecting the specimen. The bridge is balanced as long as the material in the vicinity of the two coils has the same electrical and magnetic properties. A flaw alters the properties of the specimen in the vicinity of one coil, unbalancing the bridge. The instrument locates cracks and seams, pits and gouges, laps and variations in wall thickness.

Eddy current instruments measure plating thicknesses on a variety of base metals. Cladding on fuel elements is usually much thicker than plating. Eddy current techniques also measure the thickness of aluminum and zircalloy fuel element cladding.

Difficulties—One of the problems of the technique is the effect of probe-to-metal spacing. When testing round specimens with a concentric coil, diameter variations cause changes in the spacing.

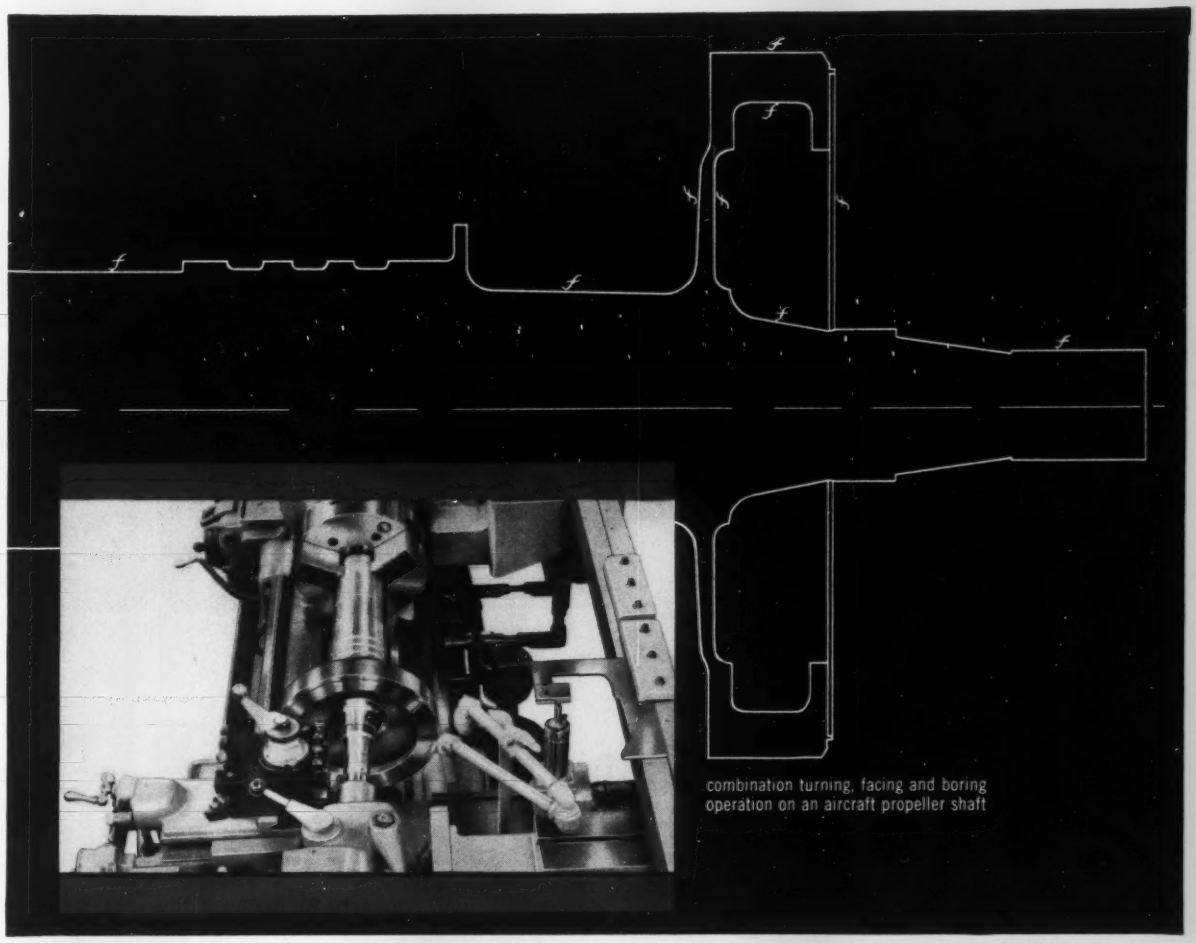
When testing with a point probe, surface irregularities and vibrations of the probe or specimen produce changes in the spacing. One technique for eliminating that effect compensates automatically for variations in probe-to-metal spacing through a special electronic circuit.

Eddy current inspection is in its infancy, but it has a great future. The technique has many limitations. Most are due to a lack of understanding of basic principles and inadequacy of instrumentation.

Generalizations are not of much value since each testing problem has some unique features. The several test methods do not compete with one another; rather, they complement each other.

These factors must be considered when selecting the best test method: Material, method of fabrication, shape and thickness of material, surface condition, processing treatments, location and size of defects, the resolution needed and the sensitivity required.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



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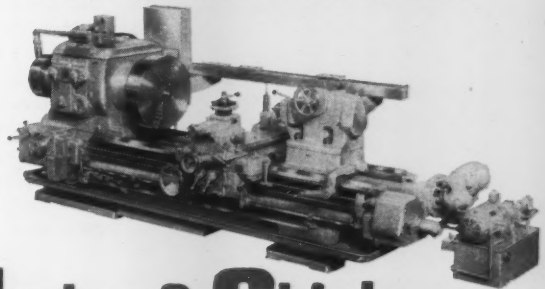

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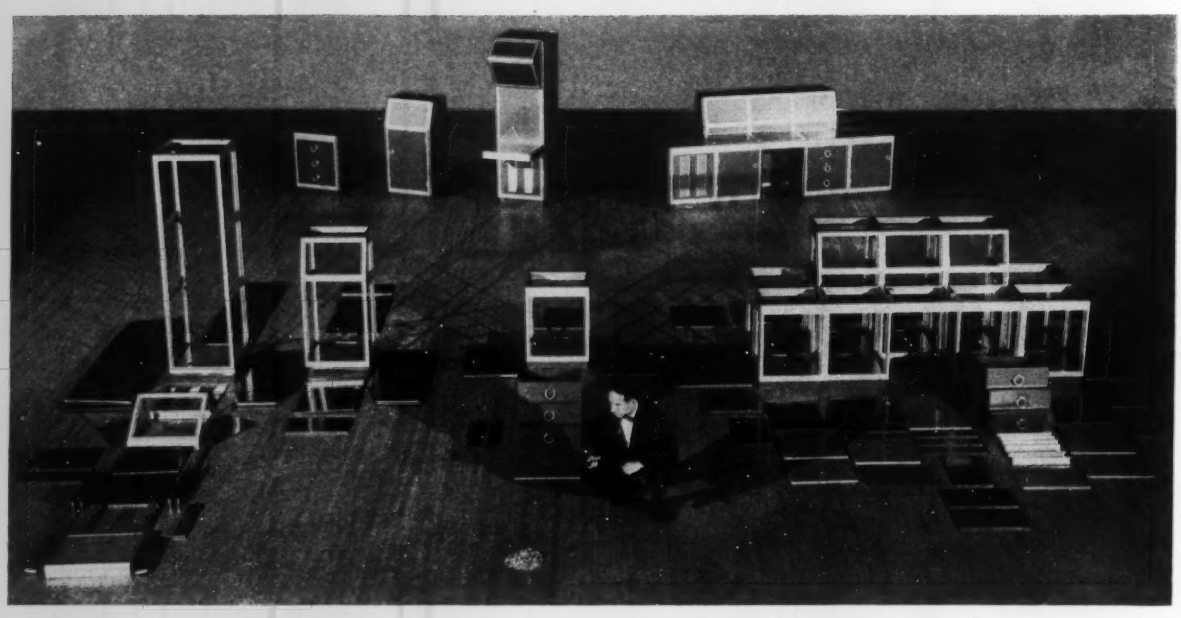


Building blocks for cabinets with a custommade look

Custom Cabinets from Building-Block Parts

An Elgin, Ill., firm applies modular design to metal cabinets for electronic equipment. They are made at one-fourth the cost of custom installations

Typical laboratory installation of recording instruments made by Brush Electronics Co. and housed in modular enclosures

DESIGN engineers working with electronics, instrumentation and automation have a major problem: Requirements for cabinets change frequently because of rapid technological changes. Equipment designed for temporary use may become a permanent installation; an original installation may be modified or expanded and require additional cabinet area.

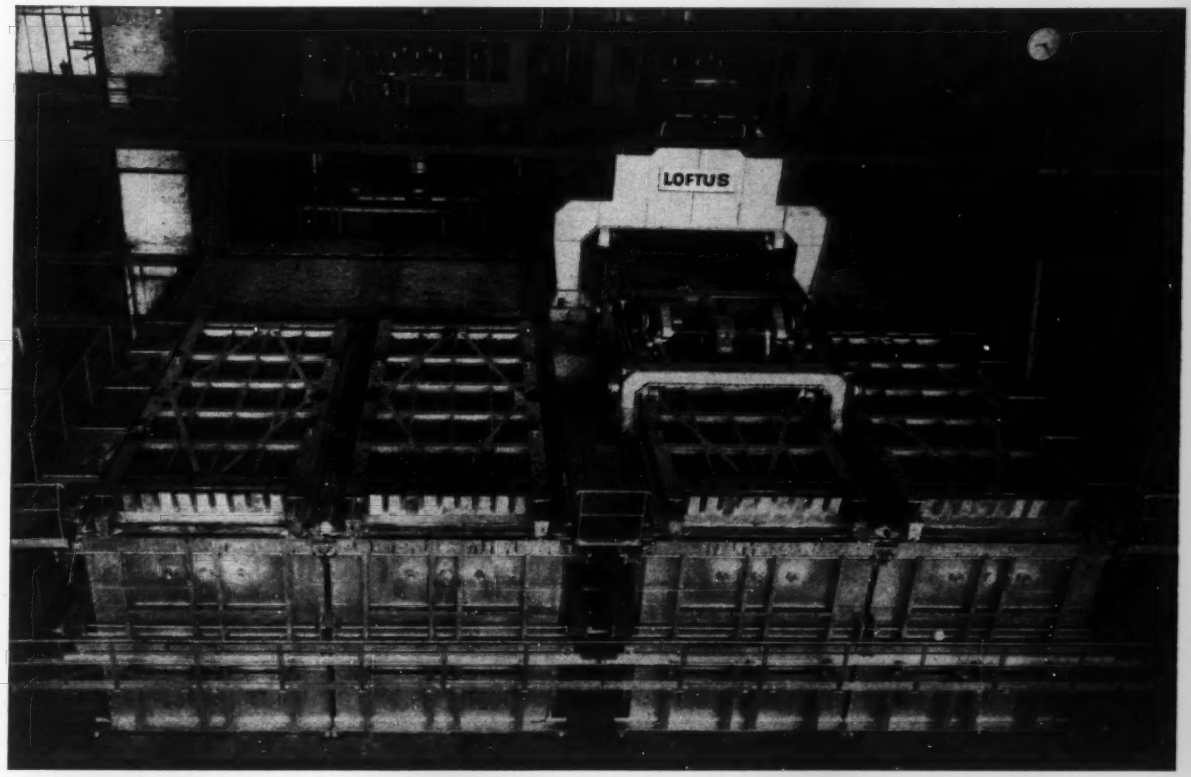
Elgin Metalformers Corp., Elgin, Ill., attacked the problem with modular design. Working from 75 basic components and 126 subparts, the company can build an almost infinite variety of metal cabinets and combinations. Each can be built for a specific use and can be easily modified later if necessary.

"Modular design not only permits fast delivery but costs are substantially lower than those of conventional custom cabinets," says S. K. Frankel, president. "Before we hit upon this idea, we were primarily a contract jobbing plant and had built six console-type cabinets for an atomic energy plant. Those cabinets cost $2200; now we can build them for $450."

Parts—Basic components used in the modular system include: 1. Skeleton frames which are roll-formed from 14 gage sheet and Heli-arc welded. 2. Panel mounting sections, perforated with mounting holes spaced 1¾-in. apart. 3. Exterior panels, doors, drawers and desk tops in a variety of sizes—they are fabricated from 16 gage sheet. All exterior surfaces are finished in two-tone-gray, baked enamel.

Frames can be bolted side-to-side, front-to-back or stacked on top of each other to 81 in. high. Exterior panels are fastened with Speed Nuts.

Normally, Elgin Metalformers builds the completed units at its factory. A few customers who use a large number of different cabinets purchase the components and assemble their own.



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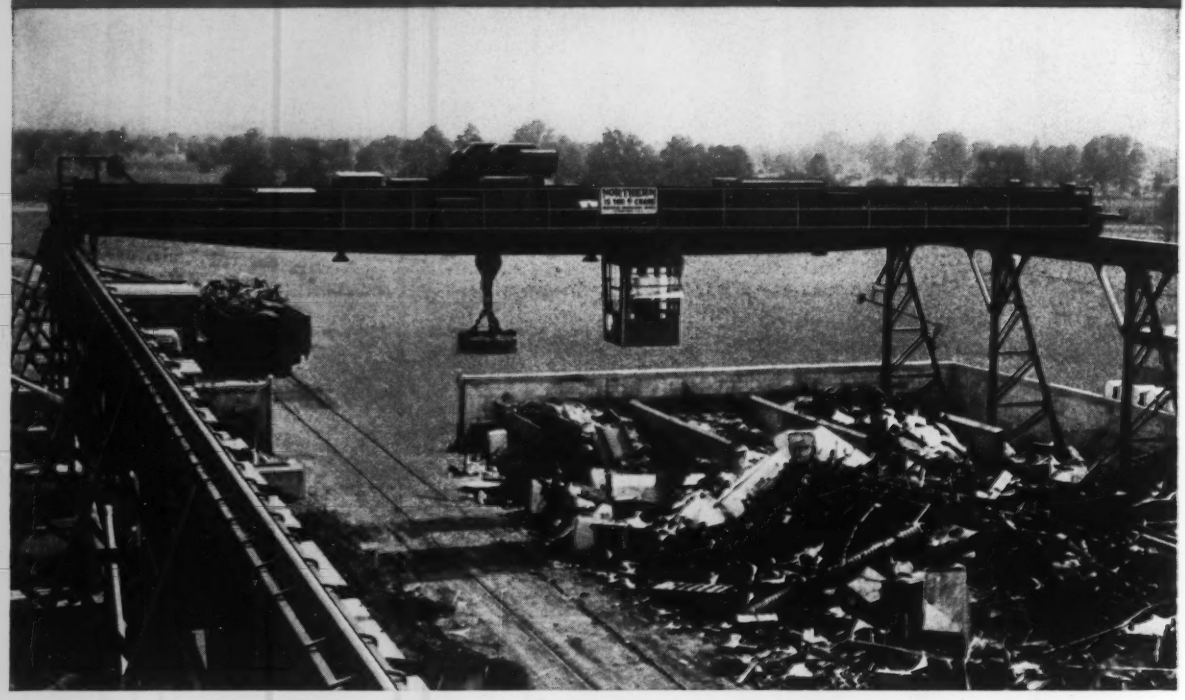
57.16.4

Look Overhead··· see "NORTHERN"



one NORTHERN crane serves many plants

LOCATION

The salvage yard of a group of individual plants manufacturing household appliances.

SPAN

80 feet, centers of runways.

CAPACITY

15 tons, magnet handling.

ELECTRICAL EQUIPMENT

A. C., full magnetic, counter torque lowering with motor generator set mounted on crane footwalk.

This NORTHERN magnet handling yard crane is solely responsible for handling all salvage materials resulting from operations of a group of adjacently located, highly automated plants, each of which manufactures a different product line of household appliances.

NORTHERN CRANES—in this and many other similar installations—assure:

(1) the advantages of higher operating speeds to handle turnover faster in relation to yard space;

(2) dependable, continuous operation with minimum downtime for service and maintenance because of their heaviest duty type bearings, gears, end trucks and electrical equipment;

(3) safer, faster, more effective load handling because the operator has better visibility from the Northern Clear Vision Control Cab;

(4) lower cost operation because oil bath lubrication eliminates need for daily lubrication, minimizes crane idle time, causes fewer parts to wear out, fail, or need replacement.

Let us explore improvement in your salvage material handling.

NORTHERN MATERIAL HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS

210 CHENE ST. • DETROIT 7, MICH.

Here's Engine Lathe That Uses Carbide Tooling

The Niles A-50 has a faceplate 50 in. in diameter. The machine swings 38 in. over the carriage bridge and 52 in. over carriage wings and bed.

Drive motors range up to 100 hp.

The headstock has a high and low range of speed gears. Gear changing is not needed to obtain standard feeds and threads.

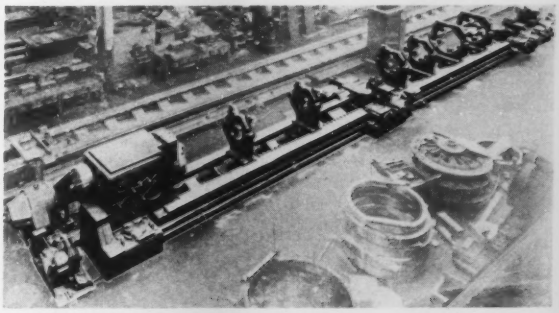
The faceplate drive provides spindle speeds from 1.5 to 35.1 rpm. Spindle drive speeds are from 40.2 to 182 rpm. Longitudinal feeds are from 0.0025 to 0.625 in. per faceplate revolution. Cross feeds are 0.0012 to 0.312 in.

Special feeds or threads are obtained by using special end gears.

The feed box is completely enclosed and produces 32 feeds or threads. The lead screw is used only for thread cutting. Feeds are provided by a separate spindle shaft. The feed take-off is on a fast running shaft; this avoids excessive speed-up from the spindle to the feed box.

The taper attachment of each carriage has a maximum capacity of 4 in. per foot on the diameter and 48 in. maximum travel in one setting.

A shifting lever at the front of the carriage selects



cross feed, power angular feed or hand feed. This arrangement prevents the hand feed from rotating during power feeding or traversing.

The tailstock has a live bolted-on center which can be used as a dead center.

A spring loaded quill provides preloading to suit the workpiece and an allowance for linear expansion.

A compound screw allows a tool to be backed off without losing the original cutter setting. *Write*: Hamilton Division, Baldwin-Lima-Hamilton Corp., Hamilton, O. *Phone*: Twinbrook 4-6511

Feed Unit Has Straightener, Edge Conditioner and Cut-Off

Coil stock is converted by this hydraulic combination unit into precision blanks (flat and to exact length) with rolled edges.

The first section of the unit is a power driven straightener which removes all coil bend and crown from the steel strip. All rolls are hardened and ground.

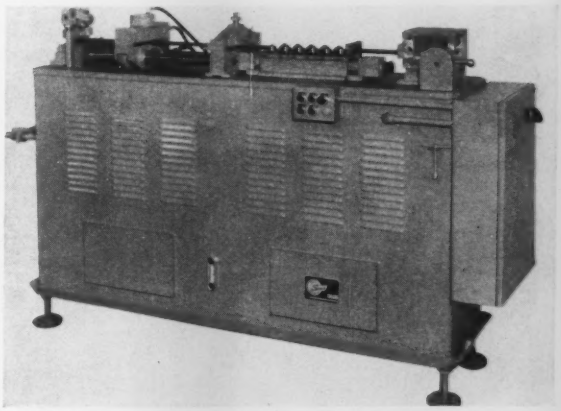
A wedge mechanism provides positive adjustment and prevents misalignment. The straightener consists of one set of pinch rolls and five straightening rolls.

The edge rolls (second section of the unit) remove all camber and condition the edge surface.

The third section is a double-gripper feed. An adjustable hydraulic cylinder makes it possible to feed consistently within 0.003 in. of the desired setting.

Reciprocating travel of the pinch gripper is governed by a stroke adjustment within the cylinder. A 4:1 ratio between the feed-in cylinder and the pinch grip assures scuff-free operation.

The pinch grip takes place before any forward feeding is possible. The grip is not relaxed until forward motion of the gripper head is complete. This prevents momentum of the stock from causing overtravel at the end of the feed-in stroke.



The fourth section, the precision cut-off, is sequenced with the feed cycle. The machine's four sections are interlocked to make the process automatic.

Because the unit is self-contained, it can readily be moved from one press to another. It is adaptable to long or short production runs. *Write*: Sesco Inc., 8881 Central Ave., Detroit 4, Mich. *Phone*: Texas 4-1701

"HARTFORD SPECIAL"

COMPLETELY TOOLED MACHINES
ready to produce on your floor

Automatic production and parts processing machinery is our business. 45 years of designing and building experience go into every machine tool that leaves our plant.

The dependable volume and consistent economy of Hartford machines is the direct result of our development and use of standard, production tested machine components.

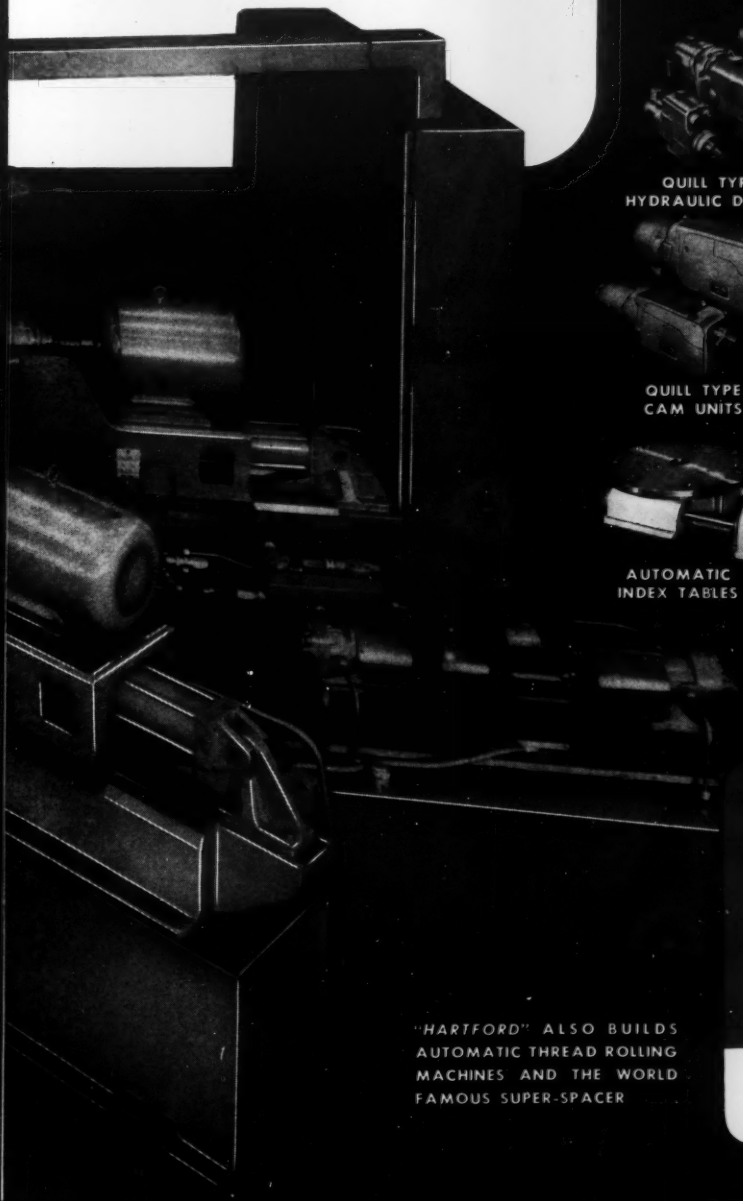
"HARTFORD" Automatic Nine Station 45 Spindle Indexing Machine. Drills, Chamfers, Probes and Reams. Machine features automatic clamp, unclamp and part ejection.

AUTOMATIC EQUIPMENT

For plants with long-run high production jobs the answer is Hartford's automated production machines . . . for plants requiring diversified short-run production, the answer is Hartford's complete range of "building blocks", standard machine components which can be assembled on your floor to fit the job. Consult Hartford engineers for both — better products at lower cost through better methods will be the result.

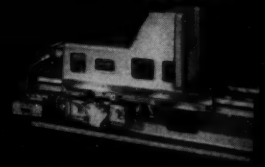
STANDARD MACHINE COMPONENTS

ready for assembly into production machines on your floor



QUILL TYPE AIR HYDRAULIC DRILL UNITS

QUILL TYPE CAM UNITS

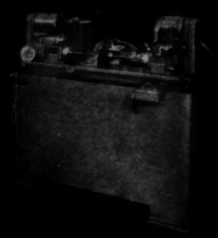


QUILL TYPE LEAD SCREW TAPPING UNITS

MACHINE BASES

AUTOMATIC INDEX TABLES

WAY TYPE HYDRAULIC FEED UNITS



"Hartford" double end drilling machine assembled completely from standard components — Drill Units, Base and Cabinet.

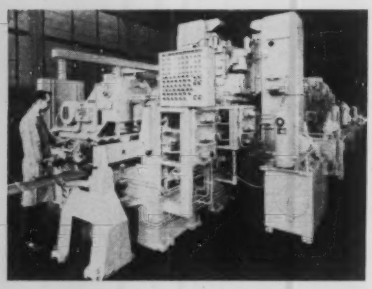
"HARTFORD" ALSO BUILDS AUTOMATIC THREAD ROLLING MACHINES AND THE WORLD FAMOUS SUPER-SPACER

HARTFORD *Special*

MACHINE TOOL DIVISION
THE HARTFORD SPECIAL MACHINERY CO.
2946 HOMESTEAD AVE., HARTFORD 12, CONN.

Transfer Machine

Two different exhaust manifolds for automotive engines are milled, drilled, chamfered and tapped on this segmented in-line machine. Production rate: 136 pieces an hour.



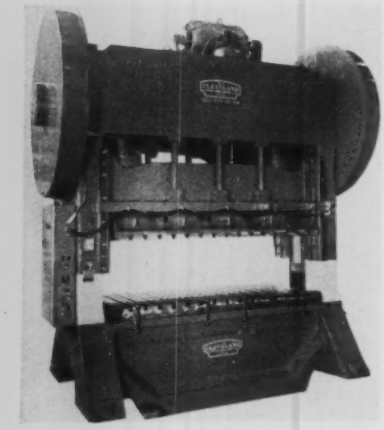
Joint faces of the two manifolds are identical. The 28-station machine mills, drills and taps these areas first.

Additional clamping support is needed for drilling, chamfering and tapping one of the manifolds. This is provided by sensing devices that find the part by detecting a cast surface and cause a hydraulically-operated clamp to engage the part.

Subsequent operations are different for each manifold. Sensing devices permit parts to pass through operating stations not needed. *Write*: Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich. *Phone*: Lorain 7-0123

Presses

This line of presses has models with capacities of 75, 90, 110, 120, 150, 200, 250 and 350 tons.



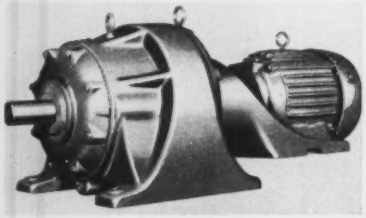
The machines can punch, form, stamp, bend, cut and do light embossing of large or irregular shapes of light sheet metal to heavy steel plate.

Die space, stroke, adjustment and bed area can be modified to suit needs. *Write*: Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., Cleveland 14, O. *Phone*: Henderson 1-1911

Gear Unit

The Motomount Syncrogear is a packaged power unit with a motor mounted separately from the gear unit. It is suited for operations that require flexibility and quick motor replacement.

Any motor of the same NEMA dimensions and rating can be used if requirements change.



The unit has double reduction gears in ratios that range from 7.6:1 to 47:1. Speed ranges are from 37 to 280 rpm and ratings are 1 to 30 hp. *Write*: U.S. Electrical Motors Inc., Box 2058, Terminal Annex, Los Angeles 54, Calif. *Phone*: Richmond 9-9029

Carbon Dioxide Welding

Mild steel can be welded in all positions with semiautomatic Fillerarc equipment. It uses consumable electrodes. Carbon dioxide gas is used for shielding.

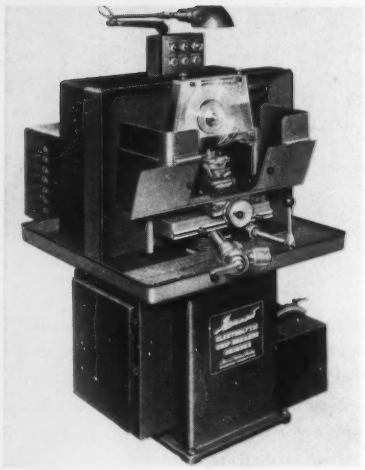
Bare wire and shielding gas eliminate problems of slag inclusion, flux removal and recovery. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Electrolytic Grinder

Model CBE-10 is a chip breaker grinder for tools up to 2½-in. wide. Wheels of 6 and 10 in. in diameter are used.

The dynamically balanced spindle has a tapered nose to assure true wheel mounting.

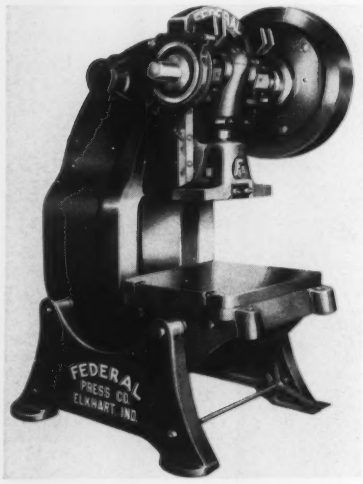
The table reciprocates on hardened and ground ball bearing ways. *Write*: Hammond Machinery Builders Inc., 1611 Douglas Ave., Kalamazoo, Mich. *Phone*: Fireside 5-7151



Press Has Big Capacity

Model 55 is a 56-ton press dimensioned to accommodate large dies. It will handle laminations, trimming of diecastings and other bulky operations.

Standard stroke is 4 in.; longer strokes are available.



The press comes in flywheel and geared models with mechanical or air clutch. *Write*: Federal Press Co., Elkhart, Ind. *Phone*: 2-5115

Speed Reducer

Ratio changes on this shaft-mounted speed reducer are made in minutes by changing pulleys.

The unit has single and double

Pick exactly the right steel for any job from J & L's complete cold finished line

steel whorl production increased 22% with J & L LEADED STEEL

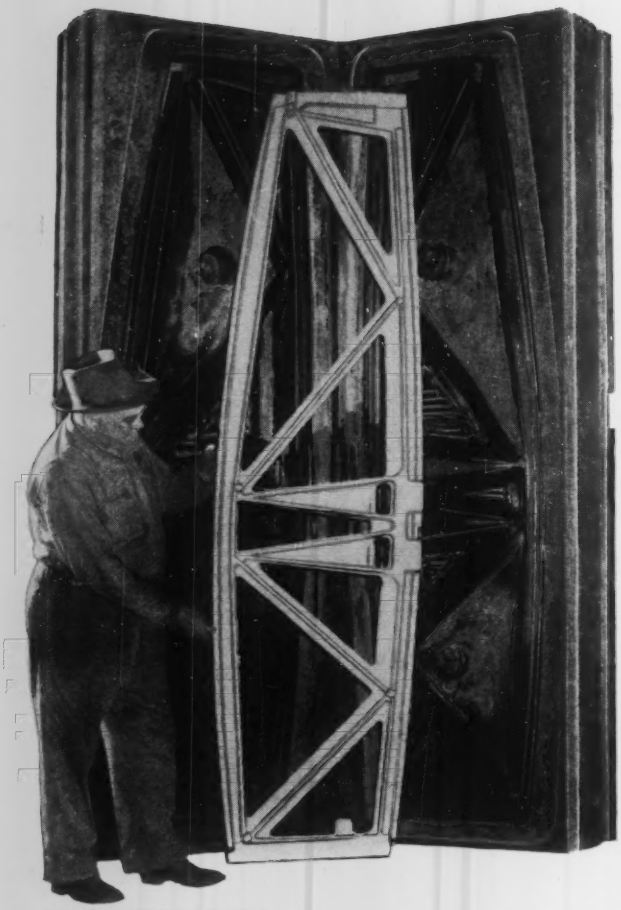
Superior uniformity and machinability of J & L 1113 Leaded Steel enabled this manufacturer to increase production from 110 to 140 pieces per hour. J & L Leaded Steels give you higher cutting speeds, longer tool life, improved finishes. Call your local distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

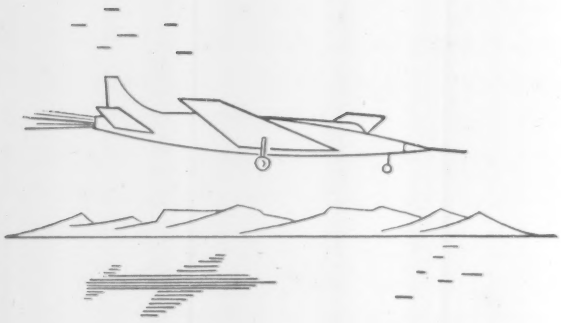
Jones & Laughlin

. . . a great name in steel

MACHINING PERFECTION always starts with the right steel



COURTESY ALUMINUM COMPANY OF AMERICA



Increase Production

with FINKL DIE BLOCKS

...the aircraft industry does!

These two 14 x 35 x 114″ FX die blocks, made from Finkl electric furnace steel, and weighing 15,800 pounds each, are used for producing precision aluminum landing gear rib forgings.

Finkl FX die blocks are noted for their long production runs and economy because:

- FX covers the full usable hardness range from Temper H (477-444 BHN) to Temper 4 (293-269 BHN).
- FX produces the greatest number of forgings per impression because its well balanced alloy content offers uniform hardness and freedom from temper brittleness. Relatively high tempering temperature promotes ductility and elimination of residual stresses.
- FX Special Machining Quality appreciably reduces shanking and sinking time.

These proved advantages can also mean savings to you with more pieces per die and better deliveries to your customers.

Save money by talking to a Finkl representative the next time you are considering die blocks or forgings.

DIE BLOCKS · FORGINGS · HOT WORK STEELS · ELECTRIC FURNACE STEELS

A. Finkl & Sons Co.

2011 SOUTHPORT AVE · CHICAGO 14, ILLINOIS

Offices in: DETROIT · CLEVELAND · PITTSBURGH · INDIANAPOLIS · HOUSTON · ALLENTOWN · ST. PAUL
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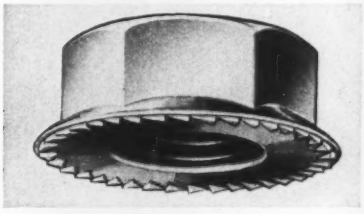
reduction ratings. It is available in ratios of 5:1 and 15:1. Ratings are ¼ to 40 hp at output speeds of 10 to 420 rpm. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Nuts Lock Tight

Spin-Lock nuts eliminate the need for lock washers. They have a ratchet-like structure on their base which bites into the bearing surface of the metal. Torque needed to loosen the nut is greater than the tightening torque.

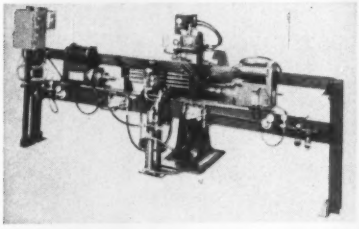


Sizes range from No. 8 to ½ in. *Write*: Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. *Phone*: Westmore 9-6000

Cutoff Machine

Metal tubes—straight, tapered or step—can be deburred and cut automatically with this machine.

In a day, Model 3D can cut more than 5000 tubes that are tapered from the middle.

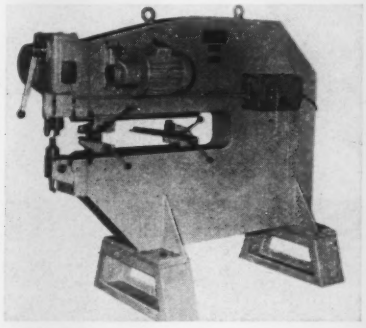


Both drilling heads are adjustable for tubes from 9 to 36 in. and 1 to 1½-in. diameters.

Either center or off-center cuts can be made. *Write*: Continental Machine Co., 1952 N. Maud Ave., Chicago 14, Ill. *Phone*: Diversey 8-6596

Shear Machine

Model P-9 has an edge cutting capacity of ⅜-in. in mild steel plate and ¼-in. in stainless steel. The machine can do straight, circle and irregular shearing operations plus slot cutting, beading, jogging, dishing, edge bending and flanging.



Stroke lengths are adjustable from 0.080 to 0.320 in. The 4-hp motor can be adjusted to operate at 500, 1000 and 2000 strokes a minute. *Write*: American Pullmax Co. Inc., 2455 N. Sheffield Ave., Chicago 14, Ill. *Phone*: Diversey 8-5727

Power for Welding

Two Fillerarc power sources are available for consumable electrode gas shielded welding. Both the constant arc length and constant voltage motor generators are rated at 450 amperes. They operate on 60 cycles.

The constant arc length welder has a rising volt-ampere characteristic which virtually eliminates burn-back and stubbing. Controls set the arc length; proper current for any wire feed speed is supplied automatically.

The constant voltage motor-generator decreases the chances of stubbing and burn-back and is said to be more suitable for consumable electrode gas shielded welding than standard motor-generators with a drooping volt-ampere curve. This unit holds arc voltage constant, independent of line-voltage fluctuations. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

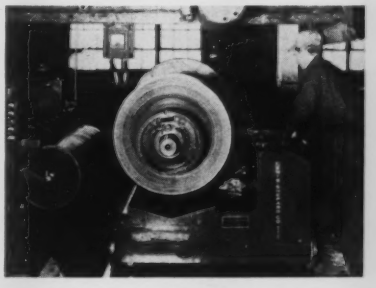
Coil Lifters

Capacities of these hydraulic and electrohydraulic units range from 4000 to 20,000 lb.

Each lifter has a V-type deck to facilitate handling of various sizes of coils.

The 4000-lb capacity unit will lift coils 18 in. It handles coils with 48-in. OD and 30-in. width.

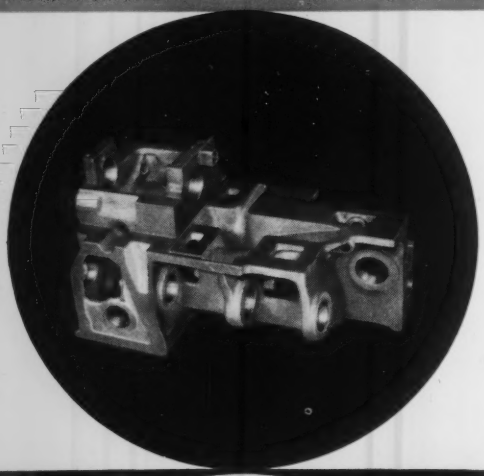
The electrohydraulic traction drive machine can handle as much as 20,000 lb, widths up to 50 in. and any diameter.



Other models have capacities of 5000, 8000 and 10,000 lb. *Write*: Department R-10, Lewis-Shepard Products Inc., 125 Walnut St., Watertown 72, Mass. *Phone*: Watertown 4-5400

Forging Presses

This line of high speed presses cannot be overloaded accidentally. A tonnage limiter automatically reduces the air pressure on the



At Brown & Sharpe

Natcos Help From

At Brown & Sharpe, a 22-spindle Natco 3-way Machine handles finished drilling, boring and reaming on "00" screw machine beds

NATCO

Slash In-Process Time 16 Weeks to One Week

On Automatic Screw Machine Beds

Even on precise machine tool parts, traditionally handled on a "job-shop" basis, Brown & Sharpe gained great advantage by installing an automatic line. Prominent in the line are two Natcos, engineered and tooled to handle all drilling, boring and reaming on either the No. 00 or No. 2 automatic screw machine beds.

One Natco does all roughing—the second handles finishing. Total of 62 operations. Each Natco is tooled to process two parts at once—tooling is interchangeable to accommodate either sized bed.

Extreme machine tool accuracy must be maintained throughout. In one operation the Natco drills through five walls, holding centers parallel to the locating surface within .0015" for the full 42" distance. In another case, Natco engineering devised a tooling leaf that automatically drops through a core in the part, providing internal boring bar support.

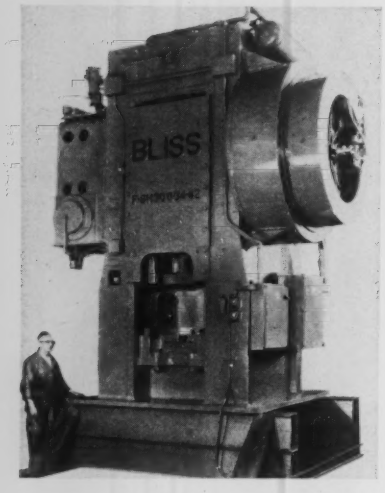
Natcos make sense even on "job-shop" jobs. Call in a Natco Field Engineer—he can quickly tell you whether a Natco can be a cost-saver on your next job.

National Automatic Tool Company, Inc.

Richmond, Indiana *Multi-spindle drilling, boring, and tapping machines. Special machines for automatic production.*

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.

NEW PRODUCTS and equipment

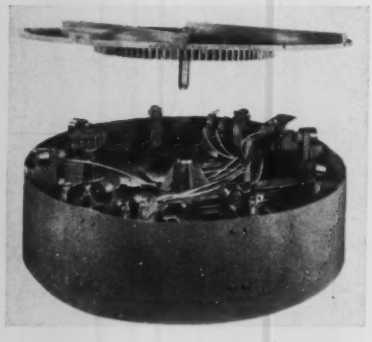


clutch as the slide approaches the bottom of the stroke and increases it on the return.

A double clam shell brake is used. All of the presses have solid frames. *Write*: E. W. Bliss Co., Canton, O. *Phone*: 7-3421

Turntable

Industrial loading operations are speeded and operator fatigue reduced with this electronically operated turntable.



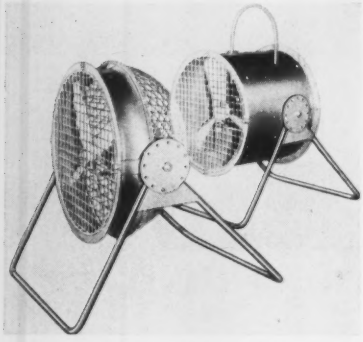
It rotates heavily loaded cars, pallets or racks quickly and smoothly.

Convenient pushbutton controls index the turntable to any of nine stations. *Write*: Manufacturers Equipment Co., 218 Madeira Ave., Dayton, O. *Phone*: Hemlock 5565

Fans

These fans (five sizes, 16 to 36 in.) are for cooling of products or personnel, drying, recirculation and elimination of air stratification. Delivery rates go up to 18,700 cu ft a minute.

The fans are direct connected and cradle mounted. They are available with either venturi entrance ring or tubeaxial construction.



A circular indexing fixture mounted on the side of the cradle permits the fan to be rotated 360 degrees to any discharge angle. *Write*: Propellair Division, Robbins & Myers Inc., Springfield, O. *Phone*: 3-6461

Platform Truck

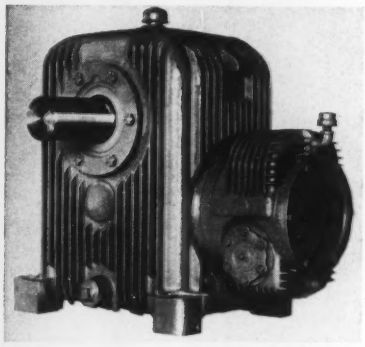
The Freighter can move loads of 4000 lb through narrow aisles at speeds up to 10 mph.

The truck's air cooled engine provides 8.1 hp at 3000 rpm. It can go up a 10 per cent ramp with a full load.

The unit is 105½-in. long. Its bed is 42 x 60 in. *Write*: Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg. *Phone*: Atlantic 8-5011

Speed Reducer

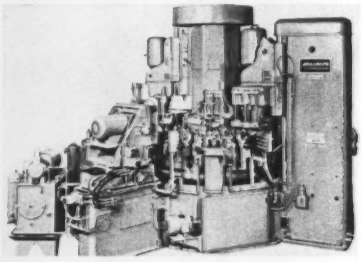
These primary-reduction units are part of a line of double-enveloping worm gear speed reducers. The new models have center distances of 2, 2½, 3 and 3½-in. Coupled with the proper secondary, they provide reductions of 25:1 to 3500:1.



Over or under position of the worm is optional on these models. A vertical gear shaft is available in right-hand, left-hand and double extended shaft assemblies. *Write*: Cone-Drive Gears Division, Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

Special Machine

This Economatic processes 102 automotive water pump housings in an hour. It does 55 operations—1 milling, 18 drilling, 10 reaming, 7 chamfering, 10 tapping, 7 spotfacing and 2 boring. Parts are clamped automatically.



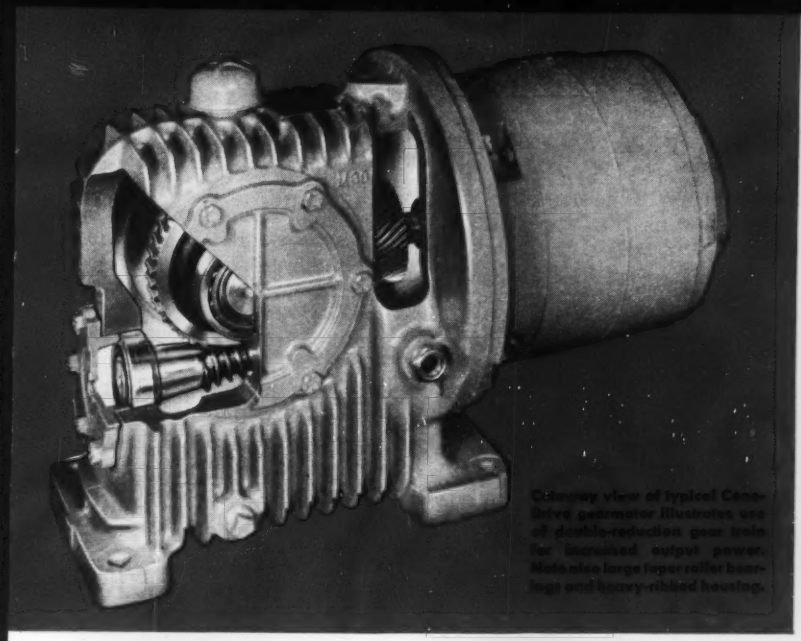
The machine can be converted easily to other parts.

All fixtures and moving parts are lubricated automatically. *Write*: Buhr Machine Tool Co., Ann Arbor, Mich. *Phone*: Normandy 2-5646

Combination Shear

This machine will punch 13/16-in. diameter holes in steel plate ⅜-in. thick and 11/16-in. holes in ½-in. plate.

Shearing capacity: 4 x 4 x ¼-in. steel angles, 4 x ½-in. flat bars, 1⅜-in. round bars, 1¼-in. square



Cutaway view of typical Cone-Drive gearmotor illustrates use of double-reduction gear train for increased output power. Note also large taper roller bearings and heavy-ribbed housing.

Announcing a

POWERFUL NEW DRIVE

by

CONE-DRIVE GEARS

Here are the "why's" for this new gearmotor

Why a right-angle gearmotor?
You save space! By tucking the entire unit in close to the driven shaft, there's nothing to stick out in crowded aisles. It's out of the way.

Why a double-reduction design?
More power! Combining a helical primary with a Cone-Drive double-enveloping worm gear secondary gives you an extremely high load-carrying capacity. Output torque ratings are much higher than those of single reduction gearmotors. Overall ratios are greater, too.

Why double-enveloping worm gears?
More power! Cone-Drive double-enveloping worm gears have proven that they provide maximum load carrying capacity on extremely small center distances. This means, in many cases, that they will handle two to four times the load of cylindrical worm gears of the same size. An added plus is high resistance to shock loads, long operating life and minimum maintenance requirements.

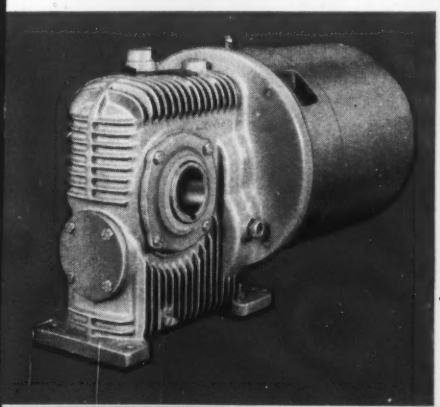
Why different types of mountings?
Flexibility! You can select Cone-Drive gearmotors with extended shaft or for shaft mounting. Both are standard. Shaft mounting often permits "hanging" the driven load on the gearmotor to eliminate pillow blocks, bearings, torque arms, shafts, pulleys, bed plates, etc. Both types may be floor, wall or ceiling mounted as desired.

Why 27 standard output speeds?
Standardization! Standard reductions range from 3.3:1 to 240:1. Speeds at 1750 rpm input range from 525 rpm to 7.3 rpm output speed. Any variation in input speed will naturally provide another complete set of 27 output speeds. Any standard type NEMA D-flange motor may be used. Other reductions may be obtained on special order at additional cost.

Why ratings to only 25 horsepower?
Demand! Extensive market research by Cone-Drive Gears reveals that this is the most popular power range in the application of gearmotors by industry. Currently we are building models in capacities from 1 to 25 horsepower. However the compact size and high capacity of the Cone-Drive gearmotor will extend this range in the future. Space requirements for higher capacities will be substantially reduced with our new design.

Why a Cone-Drive gearmotor?
Dependability! For over 20 years Cone-Drive Gears has been building double-enveloping worm gears and speed reducers. Design and manufacturing techniques have been constantly improved so that today these unique gears provide, size for size, the highest load-carrying capacity of any right angle worm gearing. Now, you can take advantage of this outstanding gearing combined into an integral package that eliminates pulleys, sheaves, belts, chain, bearings and all the trouble that goes with separate reducer and motor combinations. You'll get increased efficiency at lower cost by specifying standard Cone-Drive gearmotors.

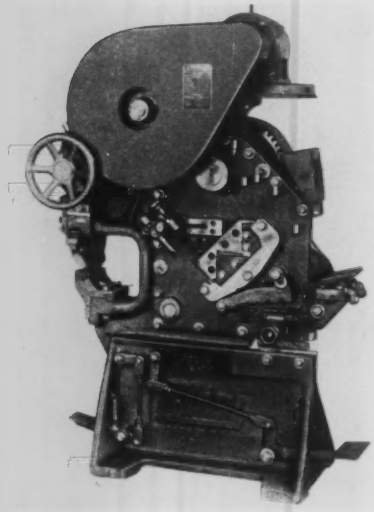
Bulletin #57 contains complete details. Ask for it today.



◀ Here's the finest shaft mounted gearmotor on the market today. It is available in all sizes with ratings identical to other Cone-Drive gearmotors.

CONE-DRIVE GEARS
Division, Michigan Tool Company
DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS
7171 E. McNICHOLS ROAD • DETROIT 12, MICHIGAN

NEW PRODUCTS and equipment

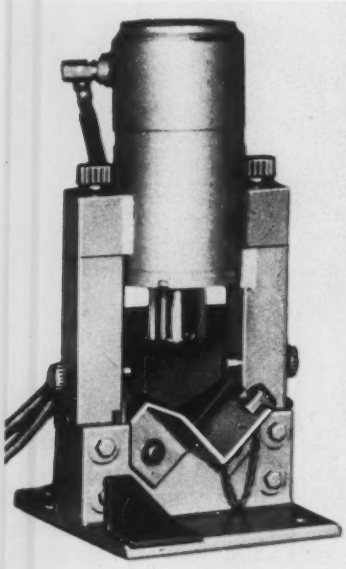


bars and ⅜-in. steel plate.

The unit also notches and copes. *Write*: Machinery Division, Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill. *Phone*: Rockwell 2-2121

Angle Iron Shear

The blade of this shear is operated by a foot treadle. Complete cycle time is 6 seconds with a 3 hp motor. The blade can be lowered, stopped or raised at will.

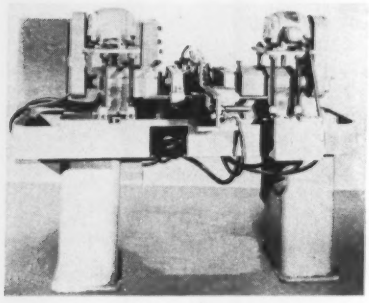


Shear capacity: 4 x 4 x ¼-in. angle iron, ⅜ x 3½-in. flats, ⅝-in. rounds, ½-in. square bars or 1 in. hollow square tubing. *Write*: W. A. Whitney Mfg. Co., 636 Race St., Rockford, Ill. *Phone*: 4-6775

Tapping Is Fast

This special machine taps 28,800 holes an hour. It processes two types of brass terminal inserts set in phenol fiber. One part has 40 holes, the other 20. Production rate: 720 an hour.

Basis of the machine is a two-way horizontal lead screw tapping

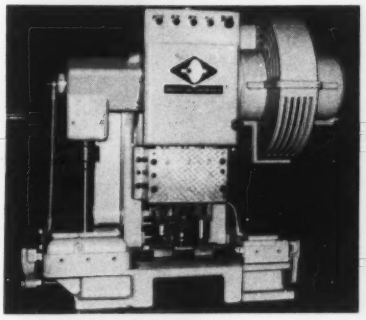


KILLING THE DEEP-DRAW BUGABOO
Bert, we're in trouble—too many rejects. They're up to one in seven. We'd better find out what's wrong—fast.
Yes, Tony, our Whitemarsh Lab tells me your rejects can be cut 'way down with a Pennsalt dry lubricant—and it'll pay for itself in no time.
OK—we'll make a trial run Tuesday.
THE NEXT MONTH

machine. Vacuum mist lubrication is used because the parts must be dry. *Write*: Ettco Tool & Machine Co. Inc., 594 Johnson Ave., Brooklyn 37, N. Y. *Phone*: Hyacinth 7-4400

Impact Former

Simple and complex stampings can be made by the Multi-Autoformer. It uses plug-in tooling with standard elements. Production rates are adjustable between 250 and 800 parts a minute.

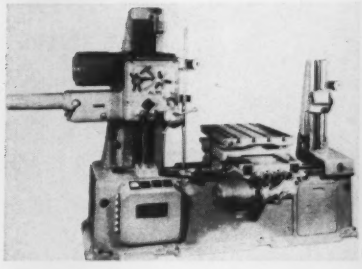


Individual dies are used for each ram. The first and third rams travel together on equal crankpins. The second ram is connected to the center crankpin which is 180 degrees out of phase with the other two.

There are five models, from 10 to 50 tons. *Write*: Multi-Autoform Corp., 432 W. Laurel, Glendora, Calif. *Phone*: Edgewood 5-6441

Borer Is Accurate

Direct readings to 0.0001 in. are possible with the Supermill Model AL55. It can be used in boring, drilling, milling and turning.



The machine is equipped for optical reading of table travel, spindle position and outboard support.

The motor-driven table is 22 x 28 in. It has six power feeds and rapid traverse in all directions. The table can rotate 360 degrees. *Write*: New Equipment Division, S & S Machinery Co., 140 53rd St., Brooklyn 32, N. Y. *Phone*: Hyacinth 2-7400

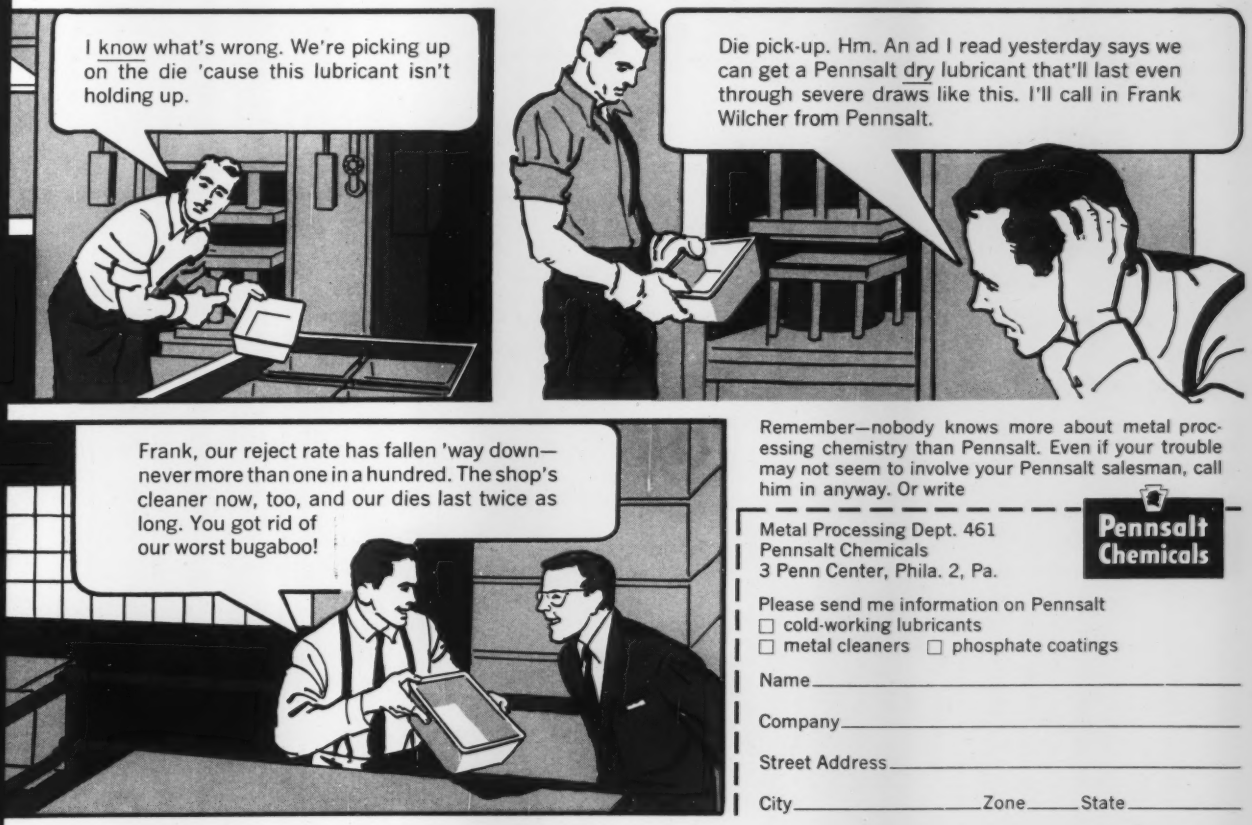
Prescription Goggles

These flash goggles have prescription lenses and side shields. The lenses come in ten styles in shade No. 2.

The goggles are for wear under the welding helmet or hand shield in inert gas shielded metal arc welding. *Write*: Air Reduction Sales Co., division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 2-6700

Rotary Die Threader

All types of machine screws and other headed parts can be threaded


I know what's wrong. We're picking up on the die 'cause this lubricant isn't holding up.
Die pick-up. Hm. An ad I read yesterday says we can get a Pennsalt dry lubricant that'll last even through severe draws like this. I'll call in Frank Wilcher from Pennsalt.
Frank, our reject rate has fallen 'way down—never more than one in a hundred. The shop's cleaner now, too, and our dies last twice as long. You got rid of our worst bugaboo!

Remember—nobody knows more about metal processing chemistry than Pennsalt. Even if your trouble may not seem to involve your Pennsalt salesman, call him in anyway. Or write

Pennsalt Chemicals

Metal Processing Dept. 461
Pennsalt Chemicals
3 Penn Center, Phila. 2, Pa.

Please send me information on Pennsalt
☐ cold-working lubricants
☐ metal cleaners ☐ phosphate coatings

Name_____

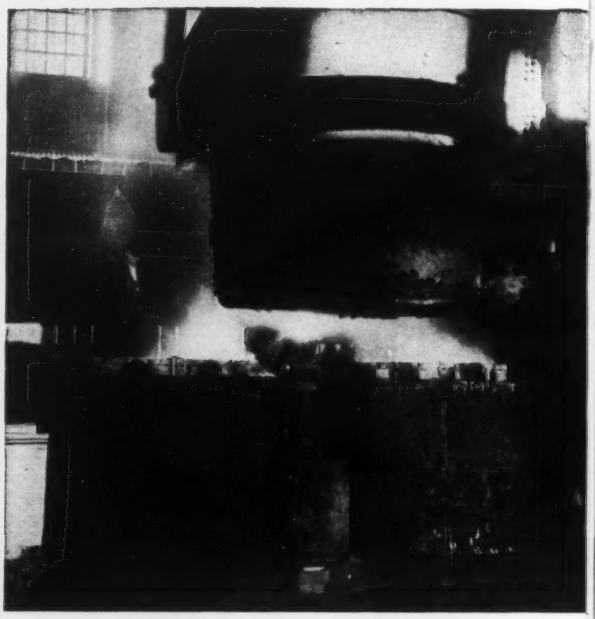
Company_____

Street Address_____

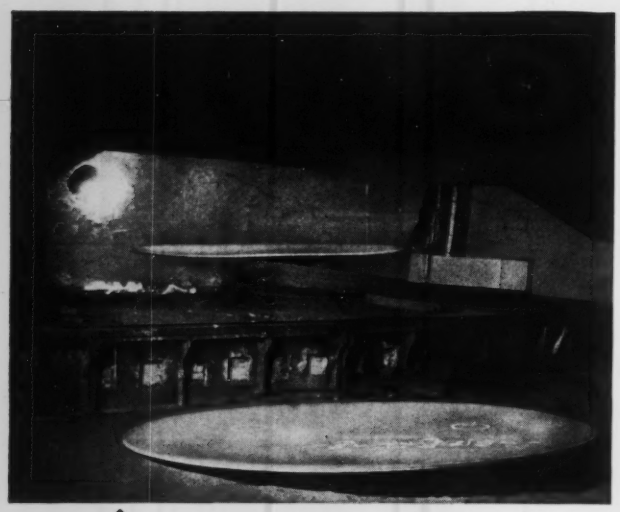
City_____ Zone____ State_____

step by step...
CLAYMONT BUILDS QUALITY INTO

Our customers have been telling us for years that Claymont Flanged and Dished Heads successfully meet every requirement for top quality. The reason behind such high performance is that we build quality into every head throughout every stage of production—from raw materials to finished product. Here's how:



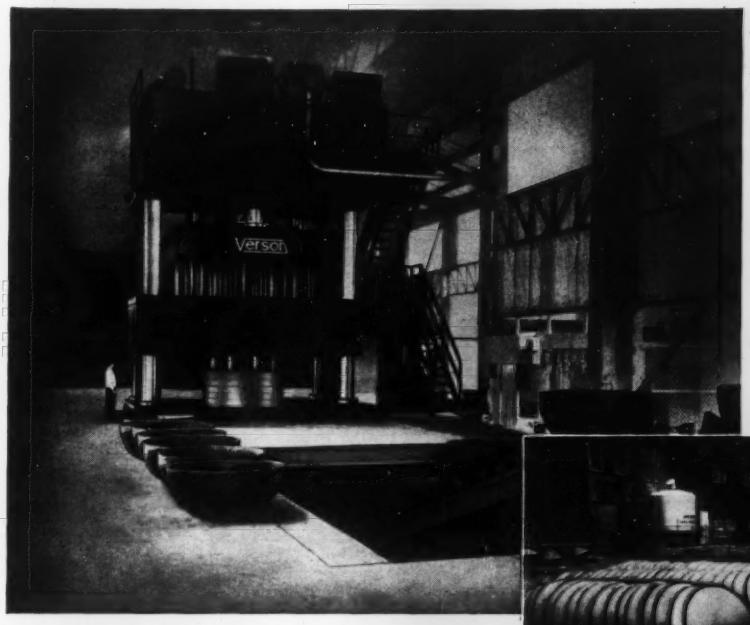
Because we make our own steel, we can carefully control its chemical and physical properties. Here, steel is being "bottom-poured". This means that the ingot mold is filled from the bottom, thus assuring a more uniform steel.



After rolling the ingots into plate, steel circles are sheared to exact size and then heated in huge furnaces like this to the proper temperature for spinning.

This highly skilled craftsman is operating a big spinning machine which produces heads up to 19 feet in diameter. Every head he makes is subjected to careful inspections, both during and after forming.

ITS FLANGED AND DISHED HEADS



Claymont's head pressing facilities include this new 3000-ton giant, capable of hot or cold forming large diameter heads up to 10 feet. With this modern equipment, Claymont can press steel heads that will meet your most exacting specifications.

Stock Heads—You can be sure of quick delivery when you order from Claymont. That's because CF&I maintains large stocks of popular size heads, as well as many types of fittings for tanks and pressure vessels, at these warehouses: Los Angeles, Tulsa, Houston, New Orleans, Chicago, Buffalo and Claymont, Delaware.

and don't forget these other important members of the Claymont family...

- **Alloy Steel Plates**
- **Stainless-Clad Plates**
- **CF&I Lectro-Clad Nickel Plated Steel Plates**
- **Fabricated Steel Parts**
- **Large Diameter Welded Steel Pipe**

Like our heads, all Claymont products have quality built in—by just such painstaking controls and tests during every step of manufacture. For complete information on any Claymont product, contact our nearest sales office or write direct to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P.O. Box 1951, Wilmington, Delaware.

4223

CF&I

Claymont Steel Products

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita

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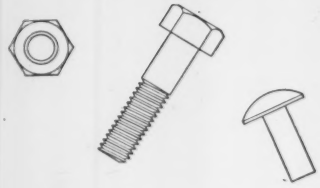
150,000,000 Standard Fastenings... Bolts, Nuts, Screws, Rivets, Washers ready for IMMEDIATE DELIVERY

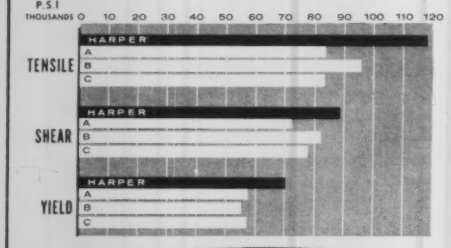
Be Specific . . . Don't Compromise . . . get the exact corrosion-resistant fastenings you need—right away—from your nearby Harper Distributor. He stocks thousands and thousands of them to give you quick service. He's an expert in fastenings and will give your order specialized attention. Why shop? Why wait? He has what you need . . . on hand BEFORE you order. They're as near as your phone. Call your local Harper Distributor today for immediate delivery.

THE H. M. HARPER COMPANY
8207 LEHIGH AVENUE · MORTON GROVE, ILLINOIS

HARPER®



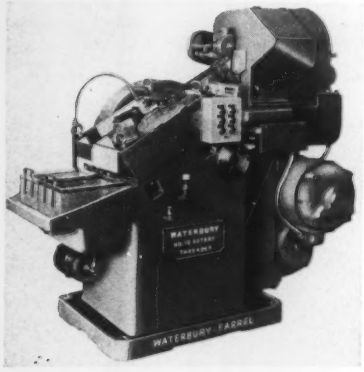
Irrefutable proof of Harper's greater metals' strength shown by laboratory test!



An important point in buying fastenings is strength. Independent laboratory tests*, utilizing Stainless Steel Machine Bolts by Harper and three other leading producers, prove Harper superiority in Tensile, Shear, and Yield Strength. The chart at left shows the actual results of these tests. For complete information on these important tests, request Form No. 126.

*By R. W. Hunt Laboratories

NEW PRODUCTS and equipment



by this machine. It uses a circular die and die segment.

The threader handles blanks from ¼ to 2 in. long and thread diameters from No. 6 to ¼-in.

Production rates on steel, brass and other conventional alloys: 200 to 600 pieces a minute. *Write*: Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. *Phone*: Plaza 6-3621

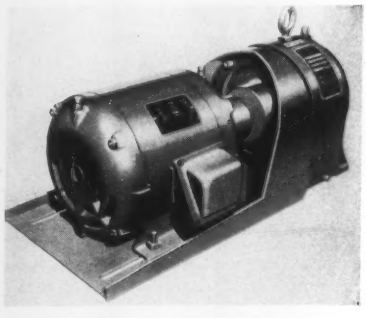
Iron Hand

These press unloaders have a small gripping area with a large gripping force. Tough steel inserts are self-clinging when the jaw is closed. Inserts can be replaced easily.

The jaw floats independently on the cylinder, the back cushion of which can be replaced quickly. *Write*: Sahlin Engineering Co. Inc., Birmingham, Mich. *Phone*: Midwest 4-7373

Gearmotor

The Line-O-Drive insures against machine down time. To change motors, only four bolts are loosened to free the motor from the end

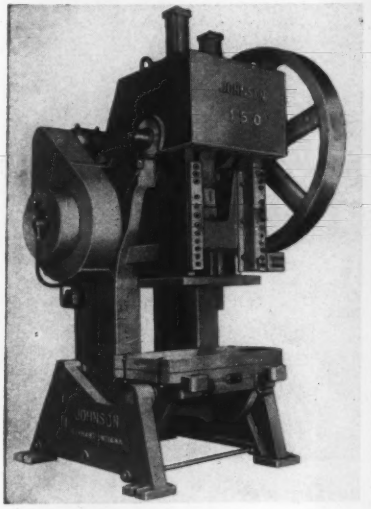


shelf and to unfasten the flexible coupling. Replacement with another standard stock motor can be made in minutes.

Motor capacities range from 1 to 75 hp. Output speeds of the reducer types are from 350 to 5½ rpm. *Write*: Howell Electric Motors Co., Howell, Mich. *Phone*: 20

Open Back Press

Model 150 is an inclinable press with a capacity of 150 tons. It has a box type ram, air clutch, spring set brake and 110-volt controls.



Standard die space of the press is 22 in. A maximum of 39 in. is available on special order. Standard stroke is 6 in., maximum 12 in.

The ram is 24 x 30 in. and the opening through the uprights is 26 in. *Write*: Johnson Machine & Press Corp., Elkhart, Ind. *Phone*: 2-7515

Cutting Oils

Cimcut Concentrates are a group of chemical additives which convert mineral oils to metal cutting oils. The proportion of concentrate varies from 1 to 20 per cent.

AA concentrate is sulphur-chlorinated, which improves tool life and finishes.

NC (noncorrosive) is sulphurized, suited for nonferrous metals.

SS (heavy duty sulphurized) is for use on ferrous metals. It is

HARPER

CORROSION-RESISTANT FASTENINGS

Put your SPECIAL problem to the Harper FLO-FORM team

This small but tricky eyebolt (reproduced here in giant size) was redesigned and produced by Harper at a 50% saving. The Harper Flo-Form Process employs highly special techniques to produce parts of economical design, with greater strength and durability, and *without* scrap loss. Call on the Harper Flo-Form engineering team of design, metallurgical, and tooling specialists to help you save dimes to dollars on parts which you find costly to manufacture. Use their more than 33 years of know-how. See what you, too, can save on corrosion-resistant fastenings and special parts. Send your problem today to The H. M. Harper Company and ask for the Flo-Form catalog.

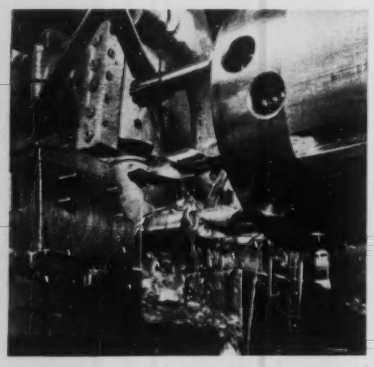
Meet GORDON GOODWIN, Harper Application Engineer

If you're in the Cleveland area, you have perhaps discussed special fastening problems with Mr. Goodwin. Gordon is another member of the Flo-Form Team which offers Harper Application Engineering Service. His wealth of experience and knowledge of fastenings is invaluable to Harper users.

THE H. M. HARPER COMPANY

8207 LEHIGH AVE., MORTON GROVE, ILLINOIS

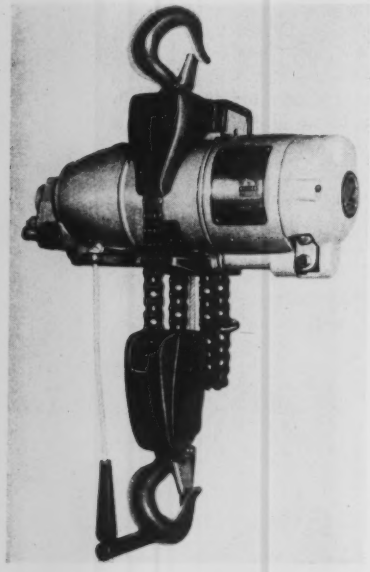
The Harper infinity symbol, as shown above, and the name FLO-FORM are registered trade marks of The H. M. Harper Company.



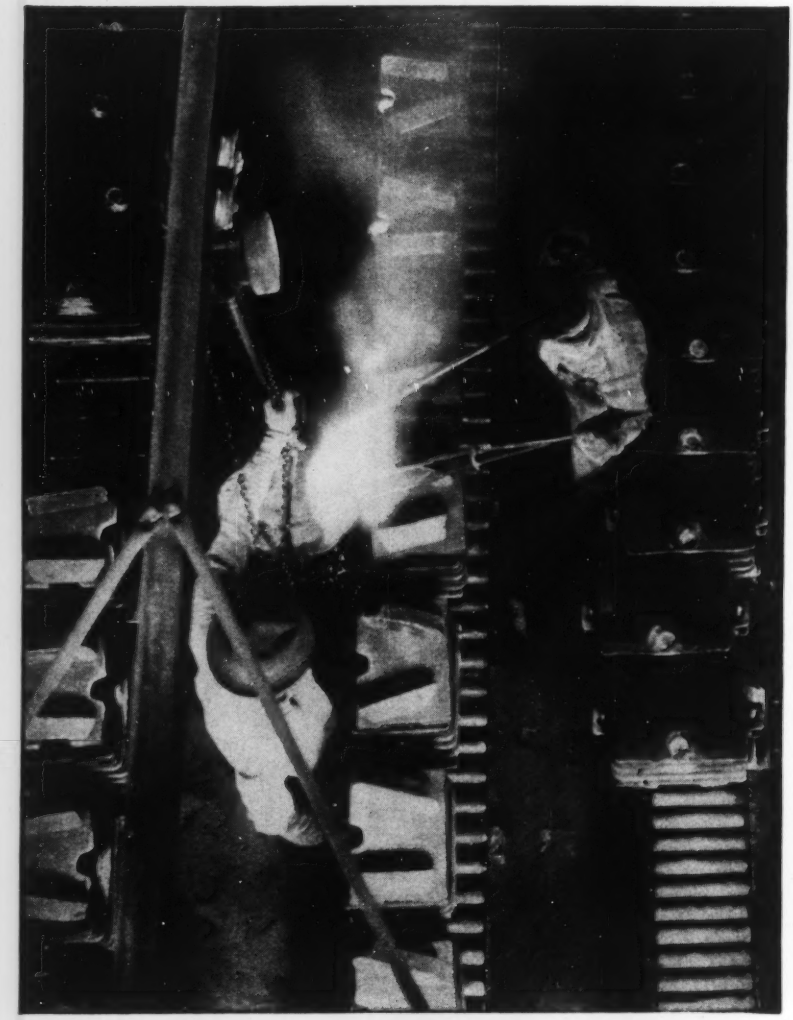
designed for low cutting speeds and small tool clearances on steels with machinability ratings of 45 per cent or less. *Write*: Cincinnati Milling Machine Co., Cincinnati 9, O. *Phone*: Redwood 1-2121

Hoist

This air-powered hoist has a capacity of 4000 lb. Lifting and lowering speeds vary from a creep to 10 ft a minute at full load and 90 psi air line pressure.



Length of lift is 8 ft. The hoist is fitted with either roller or link chain. *Write*: Keller Tool Division, Gardner-Denver Co., Grand Haven, Mich. *Phone*: 551



FEDERATED SILICON BRONZES
have ductility of 50% or better, with tensile strength up to 65,000 psi.

FEDERATED ALUMINUM BRONZES
heat treated, have tensile strength as high as 120,000 psi with correspondingly high yield strength.

FEDERATED MANGANESE BRONZES
have as-cast tensile strength as high as 125,000 psi with good ductility and high hardness.

FEDERATED ENGINEERED BRONZES
all have excellent corrosion resistance.

Federated products:

Aluminum, Babbitts, Brass, Die Casting Metals, Fluxes, Lead and Lead Products, Magnesium, Plating Materials, Solders, Type Metals, Zinc Dust

Have you had trouble with Engineered Bronzes?

The truly engineered bronzes . . . silicon, aluminum and manganese bronzes . . . give desirable combinations of properties not available in any other metals.

If you need the physical characteristics of the engineered bronzes, but if you have had difficulty in achieving them in castings, it will be worth your while to try again with Federated products.

It is difficult to make these bronzes and only many years of experience and rigid quality control will produce the metallurgical qualities desired. At Federated, ingredient specifications are adhered to rigidly. Continual spectrographic and chemical controls are used during the alloying process. Experienced metallurgists are in charge. Performance specifications are always met or exceeded.

Let us tell you more about these valuable alloys. A Federated field man will be around to see you soon. Talk to him. It will benefit you.

Federated Metals

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NEW literature

Write directly to the company for a copy

Constant Potential Control

A line of constant potential control equipment for metal rolling and processing industries is covered in bulletin GEA-6318A, 4 pages. General Electric Co., Schenectady 5, N. Y.

Industrial Trucks

Bulletin 57, 12 pages, covers industrial trucks with capacities from 1000 to 15,000 lb. Baker-Raulang Co., Box 5579, Cleveland 1, O.

Industrial Engines

Bulletin LL-4880, 4 pages, describes 4-cylinder engines for industrial use. Fageol Products Division, Twin Coach Co., 850 W. Main St., Kent, O.

Compressors

Diesel engine compressors for continuous full load operation are described in bulletin 3207, 8 pages. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Speed Reducers

This 15-page bulletin includes ratings and information on the selection of speed reducers. Alten Foundry & Machine Works Inc., Lancaster, O.

Radiation Gaging

Use of radiation in gaging sheet materials is covered in a 36-page handbook. Technical Publications Department, Tracerlab Inc., 1601 Trapelo Rd., Waltham, Mass.

Chain Lubrication

This 8-page bulletin covers the lubrication of trolley and chain conveyors. Department RSK, Conveyor Systems Inc., 325 S. California Ave., Chicago 12, Ill.

Ductility

A machine for testing the ductility of metals from 0.003 to 0.062 in. thick is described in this 2-page bulletin. Steel City Testing Machines Inc., 8817 Lyndon Ave., Detroit 38, Mich.

Dry Ice Converters

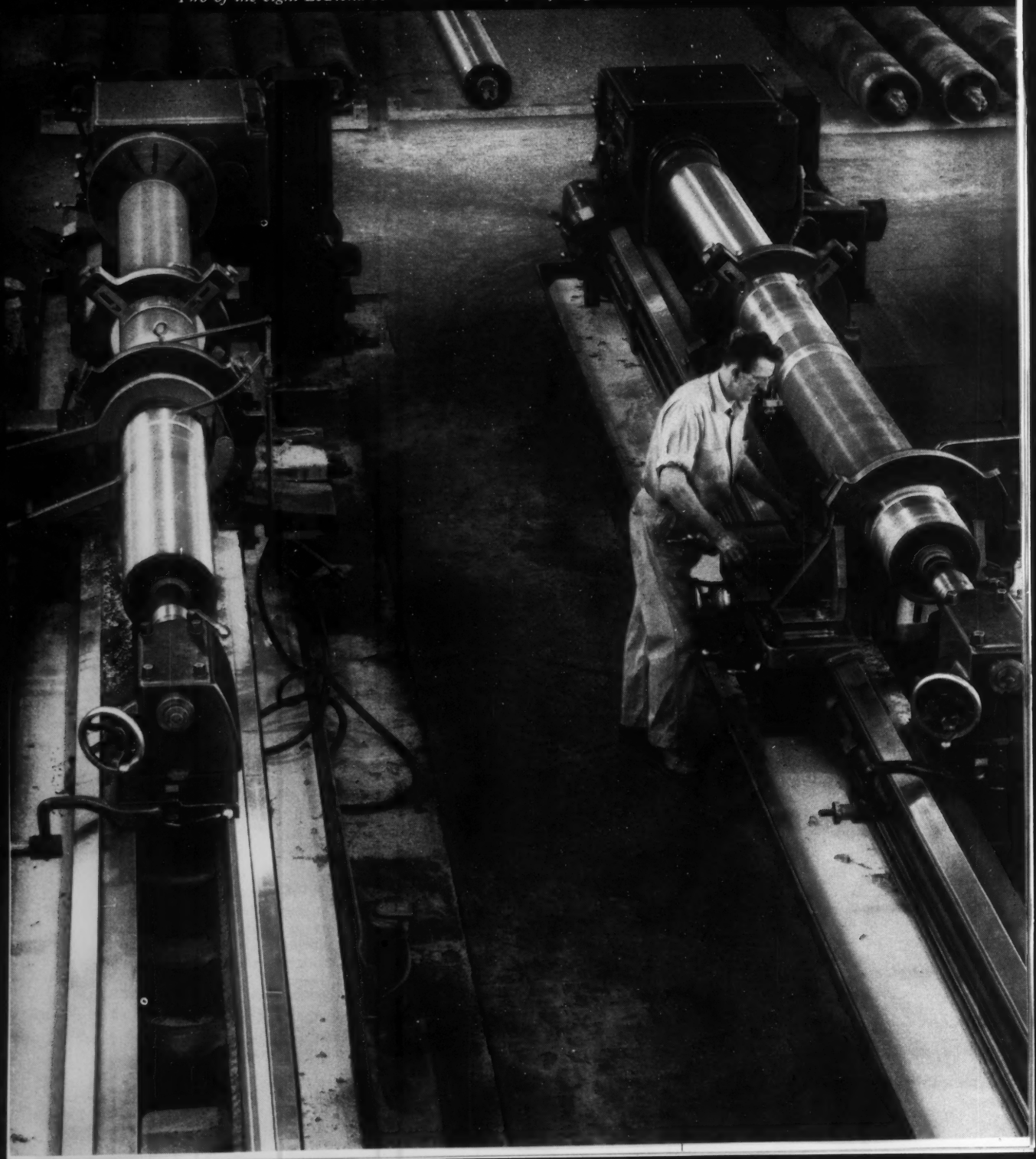
A 4-page bulletin describes converters for changing dry ice to carbon dioxide gas. Department C, Dry Ice Converter Corp., Box 1652, Tulsa, Okla.

Zinc Coated Steel

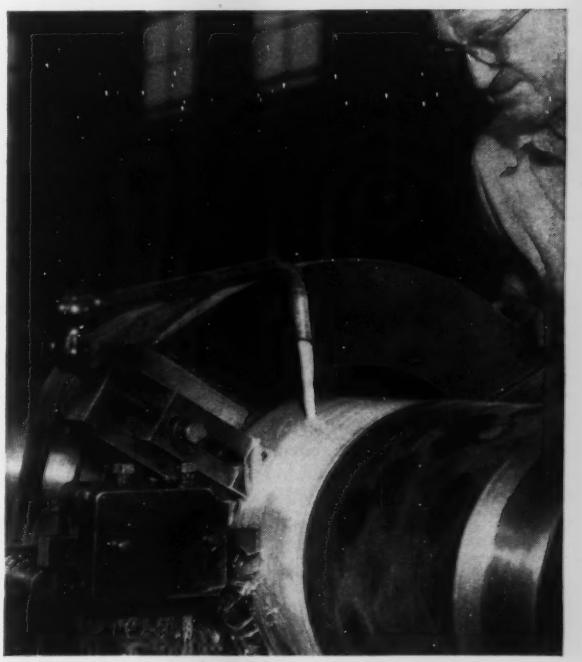
Uses of a steel needing no surface protection after fabrication are de-

Beloit Eastern needed LeBlond

Two of the eight LeBlond 25" and 32" Heavy. Duty Engine Lathes in Beloit Eastern's new pipe roll shop.



rigidity for this 3 in 1 turning idea



Finishing tool is mounted on back of special follow rest.

LeBlond lathe owners often tell us about unusual ways they are able to use our machines. There's a reason. The rigidity, accuracy, weight—the unique features of LeBlond lathes encourage owners to expect a little more of them. With LeBlonds they confidently develop turning techniques that they just couldn't expect an ordinary lathe to handle.

Take this pipe roll "skinning" job at Beloit Eastern Corporation, Downingtown, Pa. These 23′ extruded wrought steel pipe rolls must mate perfectly in high-speed paper making machinery. This calls for straight and true machining accurate to .002 end to end—in itself, a stringent test of lathe rigidity.

But Beloit Eastern had to "skin" costs, too. So they took advantage of LeBlond's unique tailstock design with their unusual 3 in 1 turning idea. Now rolls are roughed, finished and polished all in *one* operation:

1. **ROUGHING**—Carbide tool is mounted on the compound.
2. **FINISHING**—A special solid ring-type follow rest (bolted to the carriage wings) carries a tool block and high-speed finishing tool.
3. **POLISHING**—A wooden emery paper holder made like a clamp is tied together against the turning pressure of the roll.

Spindle rigidity of the LeBlond tailstock, when greatly extended, actually makes this cost-saving method possible, since room must be made for follow rest at beginning of cut. The tailstock spindle even when extended, has full-length support thanks to exclusive LeBlond Thrust Lock design.

Ask any LeBlond lathe owner. He'll tell you he likes LeBlonds because he can count on them—for more rigidity, more usable power, more years of dependable, accurate turning. After all, isn't that what *you* want in a lathe? Today, get all the details on the complete LeBlond line of heavy duty turning machines, the most dependable lathes in the world. Call your LeBlond Distributor or write. *Ask for Bulletins HD-156 (25") and HD-165 (32").*

. . . cut with confidence

THE R. K. LEBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LeBLOND of Cincinnati

World's Largest Builders of a Complete Line of Lathes for More Than 70 Years

NEW LITERATURE

picted in this 12-page bulletin. Weirton Steel Co., division of National Steel Corp., Weirton, W. Va.

Separation Plants

Bulletin E56-1R, 8 pages, describes separation plants for ore beneficiation. Southwestern Engineering Co., 4800 Santa Fe Ave., Los Angeles 58, Calif.

Tube Catalog

Information on stainless and high alloy pipe and tubing from ⅛ to 40 in. OD is given in this 48-page product catalog. Trent Tube Co., East Troy, Wis.

Resistance Welding

Machines designed to mass-produce electrical contact, conductor and terminal assemblies are described in bulletin 8-313, 12 pages. Counting circuits that control welding time are discussed in bulletin SP-19, 12 pages. Taylor-Winfield Corp., Warren, O.

Tools and Gages

Catalog 36M, 96 pages, covers precision measuring tools and gages. Brown & Sharpe Mfg. Co., Providence, R. I.

Power Transmission

This 12-page bulletin includes descriptions of synchronized transmissions and torque converters. Transmission Division, Clark Equipment Co., Jackson, Mich.

Thermistor Manual

TH-13A, 53 pages, describes thermally sensitive resistors for automatic detection, measurement and control of physical energy. Metallurgical Products Department, General Electric Co., Detroit 32, Mich.

Shock Control

Properties of plate form and multiplane mountings for isolating vibration are given in bulletin 702, 16 pages. Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.

Contour Sawing

Band sawing in which the tool instead of the work is guided is described in this 4-page bulletin. DoAll Co., Des Plaines, Ill.

Cutoff Machine

A power saw that uses high speed steel blades is described in this 4-page bulletin. DoAll Co., Des Plaines, Ill.

Pulverizers

Bulletin 257 describes standard and special purpose hammermills, shredders and crushers and lists ceramics, minerals, chemicals and metals being reduced by the crushers. American Pulverizer Co., 1249 Macklind Ave., St. Louis 19, Mo.

Direct Current Drive Unit

Bulletin 51B8166A describes a conversion unit consisting of a motor-generator set and control equipment mounted in a compact cabinet. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Mechanical Descaling

Case histories of mechanical descaling of steel are presented in bulletin 128-D, 8 pages. Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind.

Motors

Dimensions of 1/20 to 200 hp motors are listed in this 4-page bulletin. Marathon Electric Mfg. Corp., Wausau, Wis.

Strip Steels

Cold rolled specialty steels are described in a 6-page bulletin. Sandvik Steel Inc., Fair Lawn, N. J.

NEW LITERATURE

Burnishing

This wall chart describes the sizes and shapes to use on parts which need a ball burnished finish. Pioneer Steel Ball Co. Inc., Unionville, Conn.

Tungsten Carbide

Tools, tool tips, dies and wear parts made of tungsten carbide are described in bulletin 357, 32 pages. Adamas Carbide Corp., Kenilworth, N. J.

Bevel Gear Units

Bulletin 57, 4 pages, describes standardized right-angle gears for industrial uses. Airborne Accessories Corp., 1414 Chestnut Ave., Hillside, N. J.

Pneumatic Conveying

Bulletin PN-500, 8 pages, describes systems for conveying dry, free-flowing materials. Industrial Divisions, U.S. Hoffman Machinery Corp., 103 Fourth Ave., New York 3, N. Y.

Magnet Wire

This 16-page directory lists the various types of magnet wire and their tradenames. Magnet Wire Division, Essex Wire Corp., Ft. Wayne, Ind.

Fume Handling

This 4-page bulletin describes the use of air-moving equipment for handling corrosive fumes and atmospheres. Department S, Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11, O.

Torque Testing

Construction and uses of a torque testing fixture are depicted in this 4-page bulletin. P. A. Sturtevant Co., Addison, Ill.

Jigs and Fixtures

Full scale templates of clamps, keys, cams, screws, nuts, washers, handles, knobs and wheels for detailing and tracing are included in this 82-page catalog for tool designers. Harco Engineering, 12092 Woodbine Ave., Detroit 39, Mich.

Welded Chain

This table lists specifications needed to select chains for general use. Advertising Division, Republic Steel Corp., 3100 E. 45th St., Cleveland 27, O.

Punches and Perforators

This 120-page engineers' handbook outlines die design to overcome punch breakage. Durable Punch & Die Co., 9030 S. Hermitage Ave., Chicago 20, Ill.

Thermocouples

Angled and straight thermocouple assemblies are covered in bulletin TA-457, 4 pages. Claud S. Gordon Co., 3000 S. Wallace St., Chicago 16, Ill.

Hydraulic Power Units

Pumps, cylinders, valves, pressure switches and accessories are described in this 52-page catalog. Oil-Dyne Inc., 2115 W. Marquette Rd., Chicago 36, Ill.

Valves

Bulletin V-203, 43 pages, describes valves made of high tensile cast iron. Meter & Valve Division, Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

Graphite Bearings

Nonlubricated bearings which operate at high temperatures are covered in a 16-page bulletin. Electro-Nite Carbon Co., 8601 Torresdale Ave., Philadelphia 36, Pa.

Lubrication

Bulletin 70, 8 pages, describes a circulating oil system for presses and

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semiautomatic or automatic machine tools with built-in return oil arrangements. Farval Corp., 3249 E. 80th St., Cleveland 4, O.

Cement Mortar

This 24-page bulletin includes information on mortar preparation, placing procedure and instructions for gun applied linings. Universal Atlas Cement Co., 100 Park Ave., New York 17, N. Y.

Resistance Welding

More than 300 products mass-produced by resistance welding are illustrated in bulletin SP-18, 24 pages. Taylor-Winfield Corp., Warren, O.

Single Point Tools

Bulletin 571, 24 pages, lists throwaway and regrindable insert tools for lathes. Viking Tool Co., 1000 Nichols Rd., P. O. Box 471, Shelton, Conn.

Gas Manifolds

Bulletin 4486, 24 pages, covers acetylene generators, gas manifolds with automatic controls and equipment for gas piping systems. Linde Co., division of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.

Valves for Steel Mills

Bulletin SM-1, 16 pages, describes valves for automation in steel mills. Golden-Anderson Valve Specialty Co., 1252 Ridge Ave., Pittsburgh 33, Pa.

Oxide Cutting Tools

Properties of high strength, oxide base cutting tools are described in bulletin 257, 12 pages. Stupakoff Division, Carborundum Co., Latrobe, Pa.

Stainless Steel

Type 418 special, used in the 750 to 1100°F range, is described in this 4-page bulletin. Advertising Department, Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.

Tool Steels for Aircraft

This 4-page bulletin describes three grades of hot work die steels for structural parts used at elevated temperatures. Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.

Tapping

Drill press attachments for tapping and threading that run in oil are described in bulletin 22A, 6 pages. Ettco Tool & Machine Co. Inc., 594 Johnson Ave., Brooklyn 37, N. Y.

Adhesives

Bulletin 650A, 4 pages, describes typical adhesives, protective coatings and sealers. Adhesives Department, Raybestos-Manhattan Inc., Bridgeport 2, Conn.

Solvents

Properties and uses of fluorinated hydrocarbon solvents are covered in this 16-page bulletin. E. I. du Pont de Nemours & Co., 8531 Nemours Bldg., Wilmington, Del.

Dust, Smoke Photometer

A portable instrument that measures and controls outdoor and indoor air pollution is described in 8-page bulletin JM-1000-C. Phoenix Precision Instrument Co., 3803-05 N. Fifth St., Philadelphia 40, Pa.

Hydraulic Lift Trucks

Catalog 257, 24 pages, tells the complete story on a line of manually propelled, battery operated hydraulic lift trucks. Big Joe Mfg. Co., 138 Oak St., Wisconsin Dells 1, Wis.

Crane Electrical Shielding

An 8-page booklet provides complete information on polyvinyl chloride shielded electrification for overhead handling systems — bulletin KS-1. American Monorail Co., 13107 Athens Ave., Cleveland 7, O.

Industrial Solid Tires

Catalog MR-457, 16 pages, contains descriptions of standard and special tires, performance tests and preventive maintenance recommendations. A separate 20-page booklet within the catalog lists specifications for almost all makes of lift trucks. Monarch Rubber Co., 463 Lincoln Park, Hartville, O.

Boron Stainless Steel

A 6-page technical bulletin describes a new wrought austenitic alloy—1 per cent boron stainless steel —used in reactor shielding and control applications. Superior Steel Corp., Carnegie, Pa.

Air Compressor

An 8-page bulletin (form 1547) describes a two stage, 200 psig rated motor compressor in 1½ and 2 hp sizes. The compact unit can be mounted on the floor, shelf, side wall or overhead bracket. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Centrifugal Castings

Engineering data on centrifugal cast tubes are listed in a 6-page booklet. Electro-Alloys Division, American Brake Shoe Co., Taylor street and Abbe road, Elyria, O.

Steel Processing and Supply

This 14-page book describes the facilities of a warehouse operation serving New England, New York and New Jersey. Dolan Steel Co. Inc., Bridgeport, Conn.

Hydraulic Press

A 32-page book, "Money Saving Ideas," describes the 1-ton Multipress and illustrates its versatility on production jobs. Denison Engineering Division, American Brake Shoe Co., 1160 Dublin Rd., Columbus 16, O.

Weather Protected Motors

Features which contribute to the outdoor dependability of Type FOD motors (250 to 900 hp) are described in bulletin 51B8606A, 6 pages. Allis-Chalmers Mfg. Co., P.O. Box 512, Milwaukee, Wis.

Grinding Machines

Bulletin 238, 4 pages, describes a recently developed electrolytic oscillating tool grinder and a chip breaker grinder. Hammond Machinery Builders Inc., 1611 Douglas Ave., Kalamazoo, Mich.

Welding Alloy Wall Chart

The Selec-Tic wall chart lists properties and joint design for more than 150 low temperature alloys and a variety of base metals. Technical Information Service, Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing, N. Y.

Hose Fitting Make-Up

A wall card (bulletin 4433B1) gives instructions for the assembly of fittings to rubber covered, wire braid hydraulic hose. Tube & Hose Fittings Division, Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, O.

Refractory Mortars

Bulletin 600, 6 pages, contains detailed information on a line of high temperature mortars. J. H. France Refractories Co., 1944 France Rd., Snow Shoe, Pa.

Wire Design Handbook

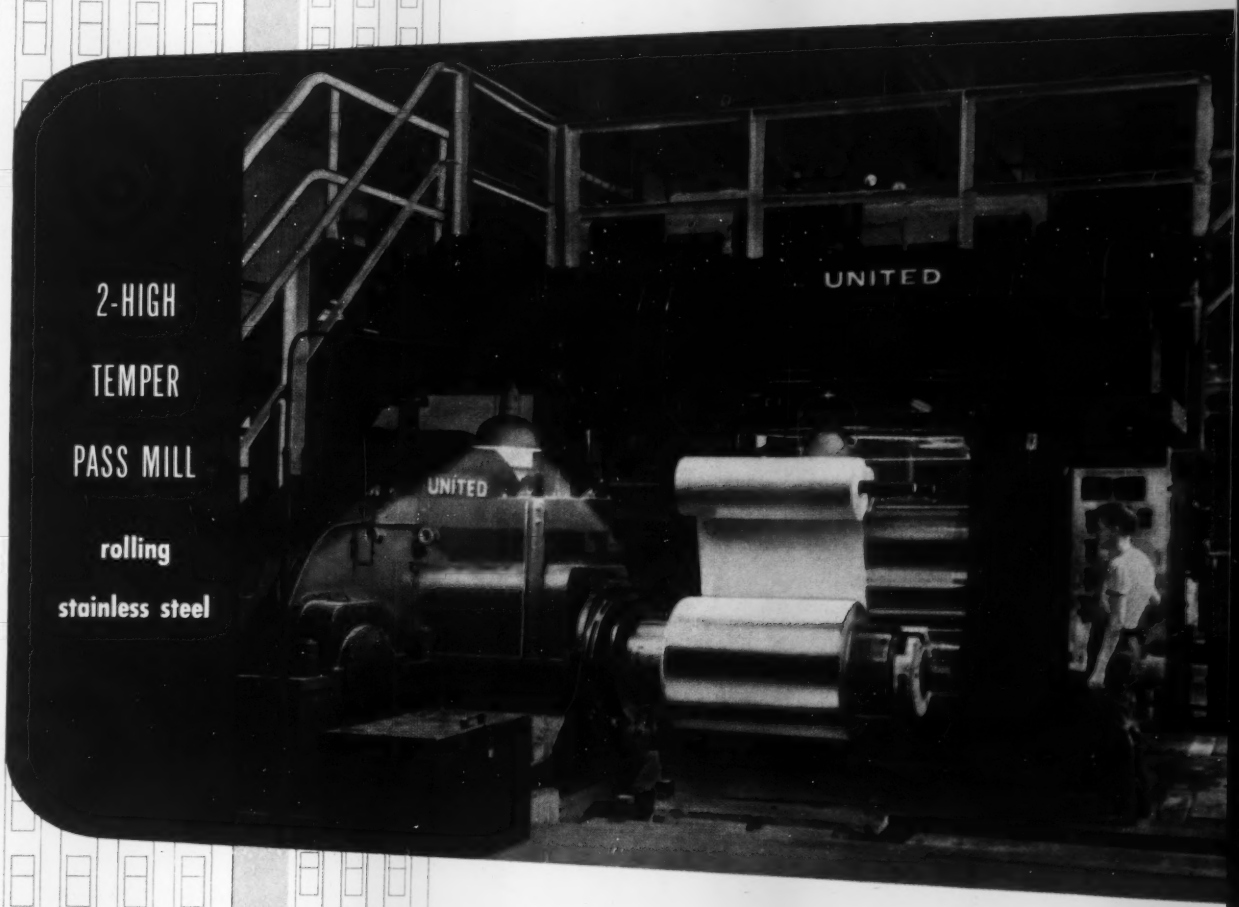
A 6-page booklet covers designing with alloy wire such as Monel, Inconel, Inconel X, stainless and heat resisting steels. Techalloy Co. Inc., Rahns, Pa.

Barrel Finishing

A 12-page booklet lists 21 cost saving studies. Charts of finishing compounds are included. Department F7-113, Minnesota Mining & Mfg. Co., 900 Bush St., St. Paul 6, Minn.

Gas Venting

This 16-page catalog lists a complete line of vent pipes and fittings for gas-burning devices. Dura-Vent Corp., 2525 El Camino Real, Redwood City, Calif.



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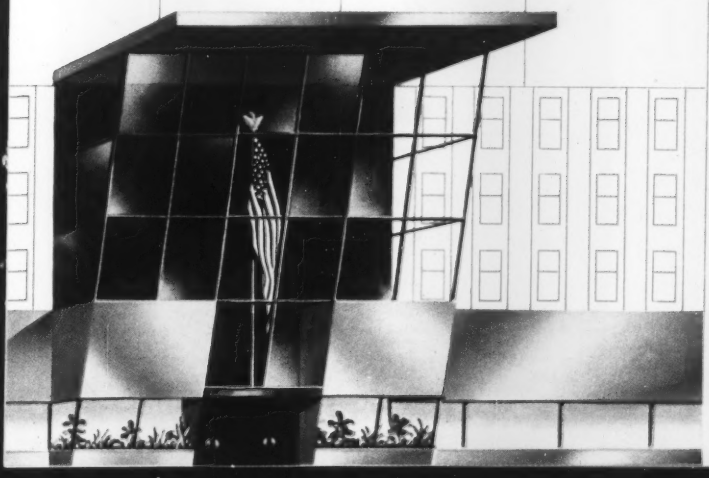

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STEEL MEN!

FIGURE THE VALUE OF A BALANCED TANK

THE ideal glass furnace is one which can be counted on to wear out evenly and uniformly, giving the operator the *full* potential value of every brick in every part of the tank.

Until a few years ago, however, such a tank was considered an obvious impossibility.

When Corhart Electrocast was first offered to the trade as a much superior glasshouse refractory, our new customers began using it to strengthen those portions of their furnaces which had always been the limiting factors in producing life.

This idea proved successful, but at the end of the fire, the Corhart was usually in such good shape that the natural result was to fortify the next weakest portions. This step-by-step process has now been followed through to its logical conclusion by most of our original customers: namely, the gradual increase of Corhart to a point where the life of the former weak portions approximates the life of the easy-service portions. This ideal construction, with the judicious use of Corhart Electrocast, has led to what is termed "The Corhart Balanced Unit."

A Corhart Balanced Unit can be fabricated for a surprisingly small percentage increase in first cost. *This percentage increase represents only a fraction of the increased life and total tonnage output.*

Corhart Balanced Tanks are now widely used throughout the industry. *More than sixty are now in service*—and this, of course, is in addition to the dozens of installations in which Corhart is used as a spot refractory. Write us today for the complete facts and figures on a Corhart Balanced Tank of *your* company's type. Full designs, specifications and quotations will be gladly furnished, without obligation. *Address:* Corhart Refractories Co., *Incorporated*, 16th & Lee Sts., Louisville, Ky.

QUALITY ECONOMY ENDURANCE

CORHART ELECTROCAST REFRACTORIES

THIS ad appeared more than 25 years ago—in January, 1932. At that time Corhart Electrocast was still so new in the glass industry that only a few of the most progressive companies dared buy it. It was, *and still is*, "one of the world's highest-priced refractories". Yet now its use is practically universal . . .

Today Corhart 104 is new in the steel industry. Like its glass-industry counterpart, it too is "one of the world's highest-priced refractories". Yet it offers open-hearth furnace operators the same opportunities for greater production and lower costs that Corhart Electrocast brought to the glass industry.

May we send you all the facts? Address: Corhart Refractories Co., *Incorporated*, 1624 West Lee Street, Louisville 10, Kentucky, U.S.A., SPring 8-4471.

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The words "Corhart" and "Electrocast" are registered Trade Marks which indicate manufacture by Corhart Refractories Company, *Incorporated*. Corhart Refractories Co., *Incorporated*, 1600 West Lee Street, Louisville 10, Kentucky, U.S.A.—Telephone SPring 8-4471.

Market Outlook

WATCH for a strong resurgence in steel demand and production before long. Two things suggest it's in the making: 1. A record rate of steel consumption. 2. A pickup in orders for products of many metalworking companies.

Evidence of the record rate of steel usage is in the Federal Reserve Board's seasonally adjusted index of metal fabrication. In the first four months of this year (and also in the final four months of 1956), it averaged 179 per cent (1947-1949=100).

YARDSTICK— Tonnagewise, steel is by far the leading metal used in the metal fabricating industry. The strength of its current usage is brought into focus by these comparisons: In the first four months of 1955 (the record steel production year), the index averaged only 157.5 per cent. In the first four months of 1956 (the second highest production year), the index averaged 169.

CONTRASTS—In contrast with 1955 and 1956, steel demand and production in 1957 have lagged. In '55 and '56, steel was bought faster than it was used. The excess went into inventories. Even though steel consumption is up markedly over those two years, demand and production have lagged in 1957. It means that consumers have been depending to considerable extent on inventories.

PROSPECT— If the metal fabricating industry continues its record pace, it will soon deplete its inventories and have to come into the market for steel—and it looks like these people will continue to have good business. Many report an increase in incoming orders.

The record rate of steel usage will probably help offset the depressing effects of vacations and hot weather on production in July and August.

UPTURN— For two weeks in a row, steel ingot production moved upward from the year's low mark of 84 per cent of capacity. A 2-point rise in each pushed the rate to 88 per cent in the week ended June 9.

The upturn stems from buying to beat a mid-year steel price increase, completion of inventory reductions by some consumers and improved business at numerous metalworking plants.

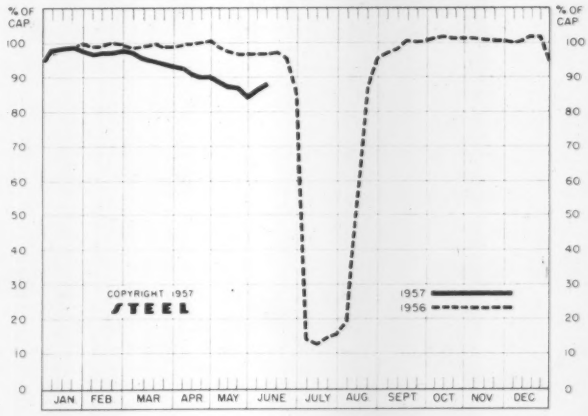
BULLISH—The scrap market continues to express confidence that steel production will strengthen. For the sixth consecutive week, STEEL's price composite on steelmaking scrap rose from the year's low point of $42.50 a gross ton. In the week ended June 5, the composite climbed to $52.33, an increase of $5.33. It stems largely from broker bidding for scrap. Dealers, who supply the brokers, are not inclined to let tonnage go at a low price.

Demand for scrap on the West Coast has eased as a result of U.S. restrictions on sales to Japan, but that country has switched its buying to semifinished steel, such as slabs and billets.

PRICES— European producers have steel for sale, and they have cut their prices again as a result of the plentifulness of steel in the U.S. Reductions range from 40 cents a ton to $11.

Prices of titanium produced in the U.S. have gone down again, too. The latest reduction, averaging 10 per cent, stems from technological advances in production and high output.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

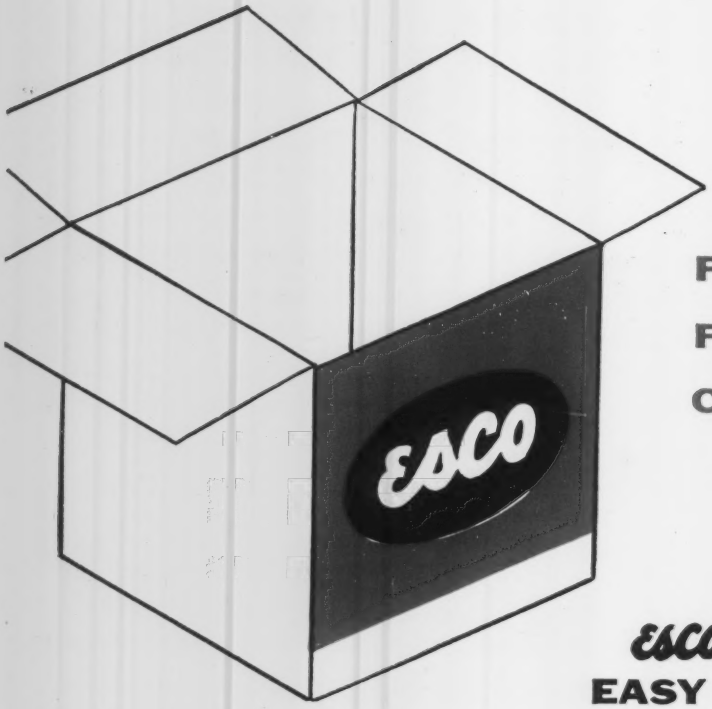
	Week Ended June 9	Change	Same Week 1956	Same Week 1955
Pittsburgh	90	+ 1.5*	99	98
Chicago	88	— 1.5*	99.5	97.5
Mid-Atlantic	94	0	98	95.5
Youngstown	70	0	101	98
Wheeling	92.5	+11	100.5	94.5
Cleveland	90.5	+ 3.5*	99	102.5
Buffalo	95	0	105	104.5
Birmingham	92.5	0	23.5	93.5
New England	55	— 1	89	90
Cincinnati	93	+ 8	94.5	91
St. Louis	89.5	— 0.5	95	95.5
Detroit	96	+ 9	95	93
Western	100	0	106	107
National Rate	88	+ 2	96.5	96

INGOT PRODUCTION‡

	Week Ended June 9	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	141.6†	140.2	138.2	148.2
NET TONS (In thousands)	2,274†	2,252	2,220	2,380

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 93 Technical Outlook—p. 141



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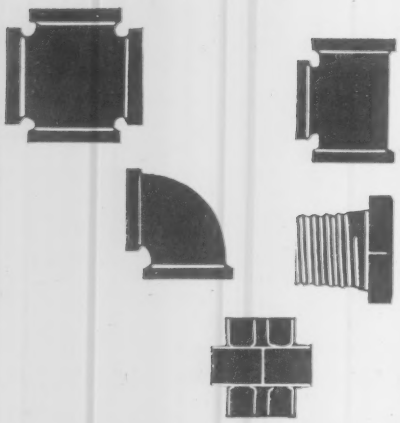

ESCO Cast Stainless fittings come to you packed in sturdy and attractive shelf boxes for your convenience in handling. Complete description of contents is plainly indicated on each container. You'll eliminate dark space-wasting and time-wasting storage bins and be able to determine your inventory at a glance.

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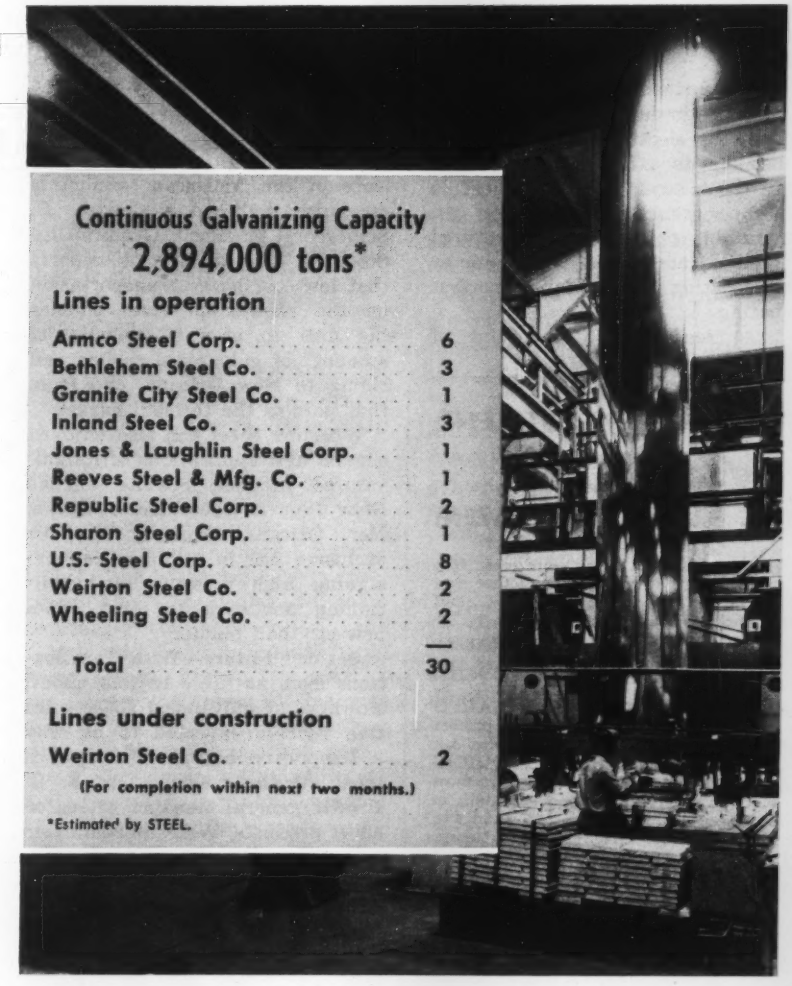

Continuous Galvanizing Capacity
2,894,000 tons*

Lines in operation

Armco Steel Corp.	6
Bethlehem Steel Co.	3
Granite City Steel Co.	1
Inland Steel Co.	3
Jones & Laughlin Steel Corp.	1
Reeves Steel & Mfg. Co.	1
Republic Steel Corp.	2
Sharon Steel Corp.	1
U.S. Steel Corp.	8
Weirton Steel Co.	2
Wheeling Steel Co.	2
Total	30

Lines under construction

Weirton Steel Co.	2

(For completion within next two months.)

*Estimated by STEEL.

Galvanizing Revolution Over

With the completion of Republic's Gadsden plant and two more lines at Weirton, the revolution in galvanizing comes to a temporary halt. Capacity exceeds demand

GALVANIZED SHEET has gone modern. New, continuous hot-dip lines can fill the entire 1957 demand for the product.

On May 30, 1955, STEEL reported (page 107) that half the nation's capacity for galvanized sheet was in continuous hot-dip lines. Capacity of lines then: 1,716,660 tons.

Today, another STEEL survey shows that steelmakers have installed enough continuous capacity to meet this year's entire demand for galvanized sheet. While eight American producers had 22 continuous lines in 1955, 11 producers now have 30 lines. Their combined capacity—2,894,000 tons—is 77 per cent of total galvanized sheet capacity of 3,756,240 tons. Production of 2,894,000 tons would have filled galvanized requirements in any year except 1956, when shipments reached 2,957,991 tons.

Sales Dip—This year, no galvanized sheet producer expects the industry to match last year's production record. Sales are off more than 20 per cent from 1956 levels. Predictions of 1957 production average about 2.4 million tons.

The whirlwind increase in continuous capacity has ended in a temporary excess of supply over demand. However, the current expansion program has nearly run its course. Republic Steel Corp. is taking orders for June and July delivery from its new line at Gadsden, Ala. Weirton Steel Co., Weirton, W. Va., expects to complete two more lines within the next two months. None of the producers has announced any plans for further expansion.

Productive Growth—Among producers which have grown at the fastest rates in two years since STEEL's 1955 survey are U.S. Steel Corp., Wheeling Steel Corp. and Republic Steel Corp. Capacity of U.S. Steel's lines increased from 552,660 tons in 1955 to 768,000 tons in 1957. Wheeling's potential rose from 144,000 tons to 360,000 tons. Republic Steel experienced a similar growth. Armco Steel Corp., the nation's second-largest producer, has six continuous units with capacity of 414,000 tons per year.

Sales are highly competitive now. Customers are hard-to-please, and the producer with the best sheet gets the orders.

Farm Slump—Sales to all major customers dropped in second quarter. Grain bin construction and other farm requirements have lacked strength, in contrast to some recent years. One midwestern producer says sales are 75 per cent of what they were in 1956. An expected upswing in third or fourth quarter will bring the year's sales to 80 per cent of last year, that firm believes. Producers which operated their continuous lines at capacity throughout 1955 and 1956 are now adjusting to a buyer's market.

Sales managers have no fear of this trend. They point out that improved coatings and a superior product have won lasting friends for galvanized steel. As representatives of Jones & Laughlin Steel

Corp., Pittsburgh, point out: "The continuous product is considered to be far superior in quality to old style, hot-dipped, pot-galvanized sheet. Many new applications are possible as a result."

Excellent Qualities—Nelson E. Cook, general superintendent, galvanizing operations, Wheeling Steel, explains: "Now, Wheeling can draw galvanized sheet into any shape the steel can stand, without cracking the coating. Forming problems rest with the steel itself, not the coating—a great improvement over early days in the industry."

Improved controls help to give a better product. "In Wheeling's lines, the electric induction pot is the key to efficient operations," Mr. Cook says. "Electric heat is 100 per cent effective. We can maintain optimum temperatures and completely effective alloying of the coating metals for a perfect coating.

"A trend to lighter coating of zinc on metal aids in several applications," Mr. Cook continues. "For example, a lighter coat makes galvanized sheet easier to weld for such applications as automobile mufflers."

Good Foreign Market—Excellence of the American product is recognized abroad. George B. Schierberg, president, Granite City Steel Co., Granite City, Ill., reports that low-cost barge transportation on the Mississippi river enables his firm to ship a "substantial amount" of galvanized roofing and siding to New Orleans, and from that port to the foreign market.

Wheeling Steel has also enjoyed several new applications of its galvanized product, SofTite. Atlas Blow Pipe & Sheet Metal Works, New Orleans, chose SofTite for exclusive use in building and designing high pressure air conditioning ductwork for that city's new city hall building.

Better Future—With applications such as these to talk about, slowness of galvanized sheet sales this year is expected to be only a temporary halt in the upward trend of the market. As F. G. Brown, general manager of coated sheet products, Weirton, comments (see STEEL, May 27, 1957, p. 59), annual output of continuously produced zinc-coated sheet may reach 4 million tons by late 1958.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 256 & 257

Seasonal influences will force sheet volume down further over the next couple months. But orders may not dip as much as had been expected a few weeks back. The reasons: There likely will be a little more buying for inventory than had been anticipated, and automotive requirements for 1958 models may come out sooner than had been indicated.

But a spotty situation is likely to prevail into late third quarter. A mild flurry of ordering may run until the latter part of June as consumers seek to protect themselves against a possible July 1 price increase. But time is too short to permit much buying of this sort.

Major consumers, including automobile and appliance manufacturers, appear to be unwilling to do much buying for inventory.

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Electrolytic corrosion is the biggest single destroyer of buried or submerged metal structures and pipelines.

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THE HARCO CORPORATION

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They are not likely to enter the market with volume purchases until after midsummer. But they can be expected to enter some spot orders in the weeks immediately ahead. The relative easiness of supplies assures prompt shipments of most items.

Demand from Chrysler and Ford is reported relatively heavier than that from General Motors.

Steel Bars . . .

Bar Prices, Page 255

While steel bar specifications for July are down, the decline is being cushioned by better demand for inventory. Various consumers are running short of certain sizes, and they are making efforts to bring their stocks into balance—particularly in the hot-rolled carbon category. But there also is some covering of cold-drawn needs.

May cold-drawn volume was off slightly from April's for most of the larger producers. Improvement is not expected until August when buying for the new automotive season gets going. Cold-drawn sales this year are off an estimated 18 to 20 per cent from a year ago.

Summer sluggishness is anticipated, chiefly because of vacation suspensions at manufacturing plants but also because of some anticipatory buying against an expected price increase July 1. Such protective buying has not been particularly large. Prompt shipments are still available from stock.

Consumers' steel inventories are ample for requirements over the weeks immediately ahead. New England chain and gear shops, among others, are not expected to step up buying much before August.

A new cold-finished bar mill at Willimantic, Conn., was placed in operation last week by Jones & Laughlin Steel Corp. Known as the Willimantic Division, the new mill will employ 60 to 70 initially. J&L formerly had to ship cold-finished bars into New England from its Pittsburgh mills. The new mill will get its hot bars from Pittsburgh. It will be among the first American firms to use Schumag continuous cold drawing machines. Coils of hot rolled steel are fed into the machines, which draw, straighten, polish and cut to length in one continuous operation.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 255

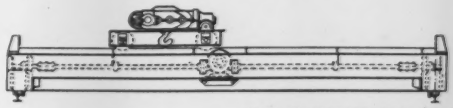
Demand for concrete reinforcing steel bars is heavy in New England, notably for bridges. A shopping center requires some 2100 tons. Including highway mesh and bridge needs better than 5500 tons are being figured in the northeast area.

Mill production is high, and supply is ample to meet deliveries. Competition among bar distributors is intense; both price and delivery figure in the placement of orders. Public work figures prominently in the market.

On the Pacific Coast, producers note a slight increase in demand for June tonnage. Seasonal factors may depress buying during the summer months. But deliveries are expected to hold at high level on old orders because of large highway and construction projects.

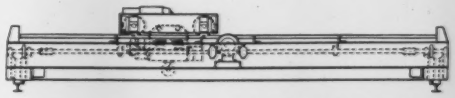
Reinforcing steel producers in

STANDARD HEADROOM
Provides highest hook height with top-running trolley and foot mounted hoisting unit.



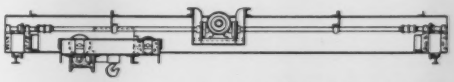
Model DTMD—TT

MEDIUM HEADROOM
Here the hoisting unit is rigidly suspended from the top-running trolley to reduce clearance over rail.



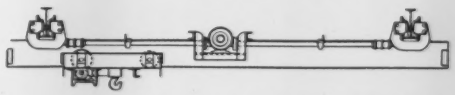
Model DTMD—LT

LOW HEADROOM
Under-running trolley permits unusually high hook lift. Use it where clearance under bridge must be maximum.



Model DTMD—UT

SUSPENDED TRACK
Operates on lower flange of crane runway suspended from roof guiders or other overhead support. Use also where load transfer is desired.



Model DUMD—UT

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the Pacific Northwest are operating close to capacity.

Plates . . .

Plate Prices, Page 255

Demand for sheared plates is active, but the pressure is not so marked as it was a few weeks ago. Generally, it is felt supplies will not be as tight over the next several months. Producers who have opened books for the entire third quarter say customers are more disposed to buy on a month-to-month basis.

Some consumers have covered their needs for the entire third quarter, but more have not. However, the mills are confident they will have all the tonnage they can handle. They also note a slight letup in demand for alloy plates for the oil industry. This may be temporary.

Mills are taking orders for strip plate for July shipment. Generally, strip plate supply is adequate, but a tightening is expected when the mills shut down for vacations and repairs.

Bids are in at Port Townsend, Wash., for a major water system job requiring 1200 tons of plates.

Wire . . .

Wire Prices, Pages 257 & 258

Vacations and hot weather will cut into wire volume over coming weeks. But current buying in the merchant and manufacturing grades is somewhat better than it has been. Protective ordering against a July 1 price increase probably is the explanation.

In general, seasonal demands have been disappointing in virtually all the wire items. Requirements on building and construction account have been fairly substantial, particularly for highway construction.

Stainless Steel . . .

Stainless Steel Prices, Page 259

Delivery of stainless steel fabrications costing $130,000 for the St. Croix Paper Co., Woodland, Washington county, Me., will be completed by July 1 by Portland Copper & Tank Works Inc., South Portland, Me. The fabrications (including stock and white water feed lines and four miles of piping) are to be used in a new high speed wide sheet machine designed for the manufacture of newsprint. They require 75,000 pounds of stainless steel, primarily grade 304.

Tubular Goods . . .

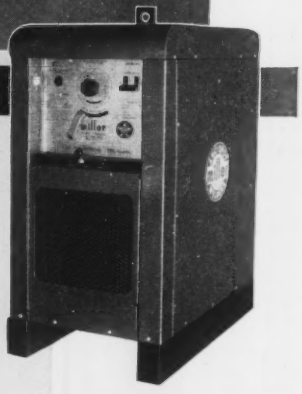
Tubular Goods Prices, Page 259

Tubemakers say third quarter order books are filling up slowly. However, they expect consumers to take all the seamless tubing they can produce. Casing and drill pipe demand is good. Supply of high alloy tubing continues tight. Seamless specialty tubing sales are substantial, but buttweld pipe demand continues spotty.

Some pipe and tubing shipments to the Southwest have been held up because of floods in that area. In some cases delays run as much as eight weeks.

Continued high level operations at the pipe mills is seen for the balance of this year by Charles W.

IT'S THE *MOST



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How is this performance possible? THE MILLER GOLD STAR SR introduces a . . .
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plus
NEW weld stabilized current
plus
NEW completely sealed semi-metallic rectifier

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Tested across the country by practical, critical, hard-bitten working weldors, here's what they say about the new Miller GOLD STAR SR:
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"easiet arc starting in my experience"
"smoothest arc I ever used . . . and . . . quiet!"
"it's just plain the MOST"
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distributed in Canada by CANADIAN LIQUID AIR CO., LTD., Montreal

Lee, president, Consolidated Western Steel Division, U.S. Steel Corp. The division's pipe mill at Provo, Utah, has rolled more than 2500 miles of pipe in its two years of operation. It produces pipe from 4-in. to 36-in. in diameter.

Warehouse . . .

Warehouse Prices, Page 260

Demand for most steel products is sluggish, and competition among distributors is increasingly keen. Buying interest remains strong for such items as tin plate, tubing, structurals and plates. Mass vacation shutdowns will be reflected in a sharp contraction in demand beginning the end of this month.

Suppliers of construction items expect demand in the summer to be second only to that of 1956 when mill deliveries were not as rapid as they are now. Some small fabricators have increased their orders for these products to beat an impending price increase. The expected hikes in nonconstruction items have not stimulated buying. Users of sheets, for instance, appear to doubt that warehouse prices will be increased enough in July to make it economical for them to accumulate large inventories for carry-over during the slack summer months.

Percentagewise, the extent of the increase should be more than that of the mills. Warehouses will have to pay the higher mill prices and a scheduled increase in wages.

A couple of warehouses in the Chicago district report that sales of specialty products (stainless, alloys and tubing) are well maintained. Reasons: Military orders are still good; special sales campaigns are paying off.

Ferroalloys . . .

Ferroalloy Prices, Page 262

Production and shipments of silicon alloys dropped 5 per cent and metal 1 per cent during the first quarter this year, compared with the last quarter of 1956, reports the U.S. Bureau of Mines. Apparent consumption (shipments plus imports, minus exports) declined 1 per cent.

Shipments from domestic furnaces totaled 201,577 tons (silvery pig iron, ferrosilicon, silicon briquets and miscellaneous silicon alloys). This compares with 865,953 tons in the first quarter of 1956, 933,063 in 1955 and 632,505 in 1954.

Imports were 4945 tons against 22,017 in the first quarter of last year, 24,359 in the like period of 1955 and 17,811 in 1954. Exports amounted to 757 tons against 2114 in the 1956 first quarter, 1689 in 1955 and 2080 in 1954. Apparent consumption in the quarter was 205,765 net tons, compared with 885,856 in the same quarter of 1956, 955,733 in 1955 and 648,236 in 1954.

Production of blast furnace silvery pig iron in the first quarter totaled 48,711 tons, compared with 60,331 in the fourth quarter last year. Shipments were 54,414 tons against 56,026.

Electric furnaces produced 133,768 tons of ferrosilicon in the period against 131,287 tons in the last quarter of 1956. Shipments totaled

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2—Proper blending of raw materials into finished products
3—Maintenance of continuous quality control during manufacture
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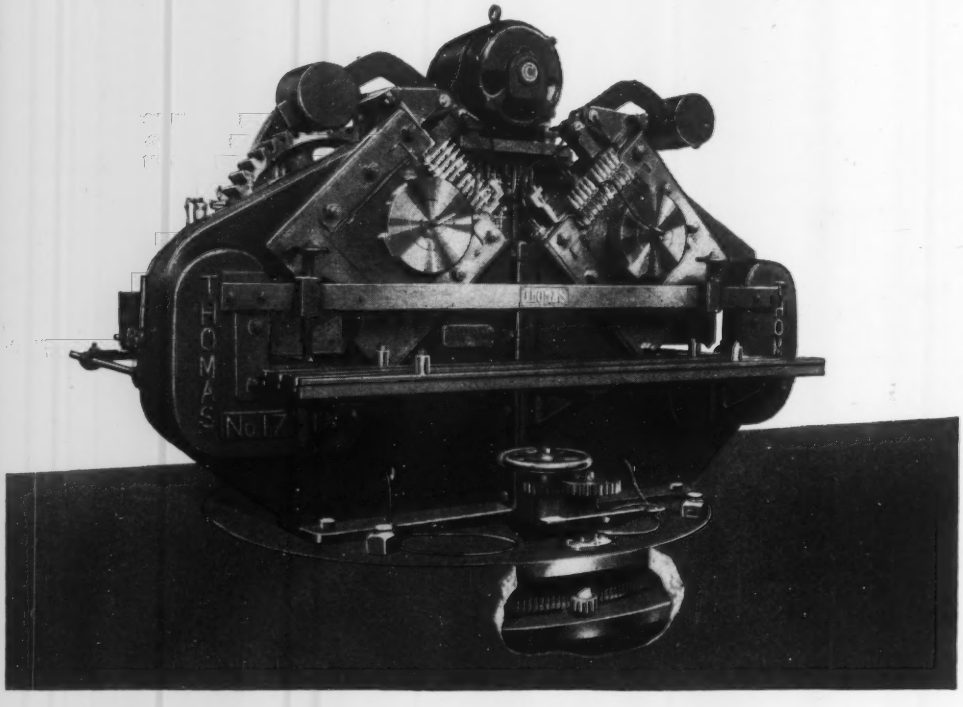
If so, it's not the first cost that counts . . . but *the cost per cut*



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123,634 tons against 127,319.

Output of silicon metal and other silicon alloys in the first quarter totaled 22,058 tons against 22,656 in the fourth quarter last year. Shipments were 23,529 tons compared with 20,062 in last year's fourth quarter.

Semifinished Steel . . .

Semifinished Prices, Page 255

U.S. Steel Corp. is building a universal slabbing mill at its Gary Steel Works & Furnaces, Gary, Ind. This will be the first new mill at the works since construction of a oloooming mill in 1931. It will handle steel slabs up to 46 in. wide.

Iron Ore . . .

Iron Ore Prices, Page 261

Total stocks of iron ore and ore agglomerates on lower lake docks and at furnaces in the U.S. and Canada on Apr. 30 were 27,228,507 gross tons, reports the Lake Superior Iron Ore Association and the American Iron & Steel Institute. This compares with 26,088,527 tons held at the same time a year ago.

The inventory of ores as of Apr. 30 this year was (in tons): 16,386,737, U.S. Lake Superior; 3,399,961, other U.S.; 779,881, Canadian Lake Superior; 2,521,932, other Canadian; 4,139,996, foreign (except Canada).

Consumption during April amounted to 11,215,125 tons, compared with 11,016,434 in the like month a year ago. In the first four months of this year, the total was 46,048,201 tons against 45,488,844 in the like period last year.

Breakdown of ore use in April (in tons): U.S. Lake Superior, 6,865,586; other U.S., 1,634,756; Canadian Lake Superior, 292,736; other Canadian, 733,257; foreign, (Canada excepted), 1,688,790.

Receipts at docks and furnaces in the month were 6,303,993 tons, compared with 7,513,844 in the like month a year ago. Receipts this year to the end of April amounted to 17,022,689 tons against 18,568,215 a year ago.

April ore receipts were (in tons): U.S. Lake Superior, 2,585,845; other U.S., 1,670,365; Canadian Lake Superior, 71,077; other Canadian, 226,565; foreign (except Canada), 1,750,141.

Pig Iron . . .

Pig Iron Prices, Page 260

Merchant pig iron demand has leveled, but another dip is expected because of the approaching vacation period. Many consumers will close down for longer periods than they did last year.

Currently, the consuming level is being supported by a slight improvement in demand from producers of pressure pipe. Pipe inventories are moving at a faster clip and the tendency of producers is to increase production a bit.

Concrete foundations have been completed for Kaiser Steel Corp.'s fourth blast furnace at its Fontana, Calif., steel mill. The furnace is scheduled to go into operation early in 1958. It is part of Kaiser's $194-million construction program which will virtually double Kaiser's 1,536,000-ton annual steel ingot capacity.

Structural Shapes . . .

Structural Shape Prices, Page 255

Structural fabricators' backlogs continue to shrink. But demand appears to be slightly stronger than it was a month ago, notably for bridges, schools and small industrial plants. Competition for new jobs is noticeably keener over the country.

Steel supplies are improving steadily. Definite easing in light structurals is noted. A slight betterment in the availability of heavy shapes and wide flange sections is reported. New England fabricators say area supplies are bolstered by bar shape tonnage and heavier volume offered by Buffalo and Pittsburgh producers.

Wide flange sections continue in tight supply, but makers are becoming more current on their shipping schedules. Mill quotas for July are about equal to those in the second quarter.

As the supply of structurals improves, expectations are that third quarter shipments may set a record. Also, easier steel supply will tend to step up competition for work as the fabricators eat into their backlogs.

Approximately 1000 tons of steel, mostly structurals, are required for the Rocky Reach dam and power house in the Seattle district.

Imported Steel

Prices per 100 lbs. (except where otherwise noted) landed, including customs duty, but no other taxes.

	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (⅜" Dia. incl. all extras)	$7.13	$7.36	$7.02	$6.76
Merchant Bars (¼" Round incl. all extras)..	7.67	7.90	7.53	7.27
Bands (1"x⅛"x20' incl. all extras)	7.81	8.03	7.70	7.43
Angles (2"x2"x¼" incl. all extras)	6.77	7.00	7.21	6.93
Beams & Channels (base)	7.17	7.41	7.67	7.45
Furring Channels (C.R. ¾", per 1000')	26.62	27.77	32.70	31.60
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's, bright, low C, (11½ ga.)	7.38	7.52	8.52	8.52
Wire, galvanized, low C, (11½ ga.)	8.01	8.15	9.42	9.42
Wire, Merchant quality, bl. ann., (10 ga.)....	7.60	7.75	8.78	8.78
Rope Wire (.045", 247,000 PSI, incl. extras) ..	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.) ...	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14½ G, 79 lbs. net) ..	7.81	7.96	7.77	7.77
Merchant Pipe (½" galv. T & C, per 100')...	8.64	9.11	...	...
Casing (5½", 15.5 J55, T & C, per 100')	194.00	199.00	...	...
Tubing (2⅞", 6.4 J55, EUE, per 100')	103.00	104.00	...	...
Forged R. Turn. Bars, C-1035 (from 10" dl.)	14.00	14.23	14.00	13.74

Ask prices on: Bulb tees, bolts and nuts, coated and specialty strip, welded wire reinforcing mesh and hardware cloth, boiler tubes, API line pipe, A-335-P11 pressure pipe.

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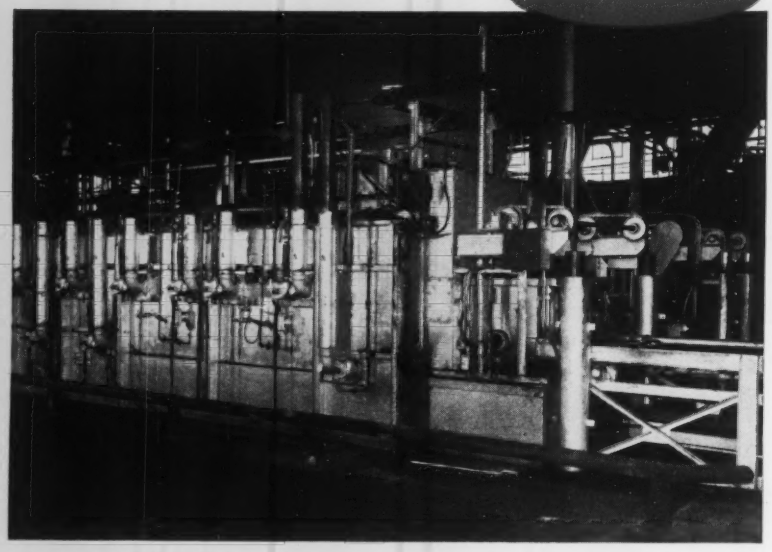

LET'S TALK ABOUT

PRODUCTION DEMANDS

High production demands can be met only when every piece of equipment in the plant is geared to its job. In many plants, the bottleneck is heat treating because furnaces which were modern five years ago are virtually obsolete. These units must be replaced, redesigned, or added to.

Automatic handling of materials is one answer, of course. Today, some heat treating systems are tied right into production lines. In other plants, work is centralized with automated equipment eliminating most stock handling. A single operator loads green work and removes finished parts.

Some furnaces accomplish dual jobs. A recent Holcroft installation was built to temper two entirely different classes of carburized parts. The furnace was designed with a double chamber with each side operating at the required temperature. Flags, placed on the trays requiring low temperature tempering, keyed the line so that the work automatically positioned itself in front of the correct chamber. Another installation featured a double deck furnace—designed so that two entirely different heat treat processes were accomplished in space where but a single furnace would normally go.

And so it goes: a little idea to save a minute or to eliminate a manual operation—a brainstorm that combines two or more furnaces or steps up furnace capacity. This Holcroft concept can help you produce more for less and with better quality. Better write today.

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CANADA: Walker Metal Products, Ltd., Windsor, Ontario

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5000 tons, state bridge over Susquehanna river, Harrisburg, Pa., to Harris Structural Steel Co., New York.

1000 tons, plant and office buildings, Martin Co., Orlando, Fla., to Sheffield Steel Co., Birmingham; Thompson & Street Co., Charlotte, N.C., general contractor.

500 tons, including reinforcing bars, office and garage, Baptist Memorial hospital, Memphis, Tenn., to Fischer Steel Corp.; S. & W. Construction Co., Memphis, general contractor.

260 tons, high school, Horsham township, Montgomery county, Pennsylvania, to Robinson Steel Co., Philadelphia.

250 tons, power house crane, Noxon Rapids project, Montana, to American Hoist Pacific Co., Seattle, by Washington Water Power Co., Spokane, Wash.

220 tons, high school, Chelmsford, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Vara Construction Co., Boston, general contractor.

215 tons, West junior high school, Milton, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; M. S. Kelliher Co., Boston, general contractor.

125 tons, elementary school, Killingly, Conn., to Rumford Steel Co., Rumford, R.I.; J. L. Marshall & Sons Inc., Pawtucket, R.I., general contractor; 35 tons, reinforcing bars, Plantations Steel Co., Providence, R.I.

190 tons, state bridge, Montgomery county, Pennsylvania, through Union Paving Co., Philadelphia, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

3028 tons, state bridge, over Schuylkill river at Chestnut street, Philadelphia; bids June 21; also 1289 tons of reinforcing steel. These tonnages are involved in schedule A; in schedule B, 879 tons of structural steel and 156 tons of reinforcing steel are specified.

1894 tons, state bridge work, York county, Pennsylvania; bids June 21; also 404 tons of reinforcing steel.

1000 tons, miscellaneous items, Rocky Reach power project, Wenatchee, Wash.; bids in June.

200 tons, state bridge work, Luzerne county, Pennsylvania; bids June 21.

REINFORCING BARS . . .

REINFORCING BARS PLACED

900 tons, plant and office buildings, Martin Co., Orlando, Fla., to Connors Steel Division, H. K. Porter Company Inc., Birmingham; Thompson & Street Co., Charlotte, N.C., general contractor.

700 tons, Ft. Hill Square garage, Boston, to Northern Steel Inc., Medford, Mass.; S. & A. Allen Construction Co., Boston, general contractor.

450 tons, office building, Southern New England Telephone Co., New Haven, Conn., to Concrete Steel Co., Boston; George B. H. Macomber Co., Boston, general contractor.

290 tons, high school, Chelmsford, Mass., to Northern Steel Inc., Medford, Mass.; Vara Construction Co., Boston, general contractor.

195 tons, school, Milton, Mass., to Concrete Steel Co., Boston; M. S. Kelliher Co., Boston, general contractor.

100 tons, mill building, Scovill Mfg. Co., Milford, Conn., to Concrete Steel Co., Boston; Turner Construction Co., Boston, general contractor.

REINFORCING BARS PENDING

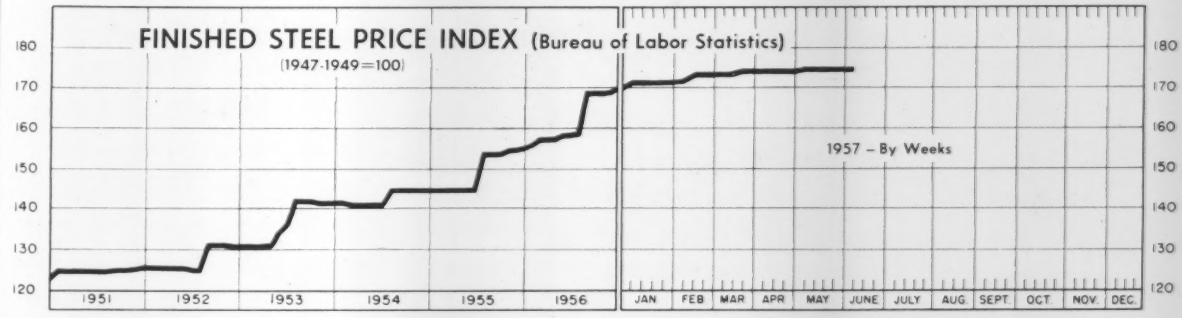
1600 tons, 16 piers and substructures, Washington state, Washington Narrows bridge; bids to Olympia, Wash., June 18 (1000 tons of shapes for the superstructure were previously awarded to Independent Iron Works Inc., Oakland, Calif.).

1225 tons, viaduct section, Fitzgerald expressway, Boston; M. DeMatteo Construction Co., Quincy, Mass., general contractor.

865 tons, Hills Creek dam, near Oakridge, Oreg.; Green Construction Co., Des Moines, Iowa, and Tecon Corp., Dallas, joint low to U.S. Engineer, Portland, Oreg., $20,572,366 (22.67 per cent above estimate).

300 tons, addition to St. Luke's Hospital, Bellingham, Wash.; Elford Construction Co., Bellingham, low at $920,961.

Price Indexes and Composites



June 4, 1957	Week Ago	Month Ago	May Avg.	Year Ago
174.3	174.4	174.4	174.4	158.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended June 4

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.350	Bars, Reinforcing	5.788
Rails, Light, 40 lb	6.817	Bars, C.F., Carbon	9.910
Tie Plates	6.275	Bars, C.F., Alloy	13.425
Axles, Railway	9.400	Bars, C.F., Stainless, 302 (lb)	0.533
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.945
Plates, Carbon	5.900	Sheets, C.R., Carbon	6.789
Structural Shapes	5.667	Sheets, Galvanized	8.006
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.660
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 430 (lb)	0.475
Bars, H.R., Alloy	10.150	Strip, H.R., Carbon	6.000
Bars, H.R., Stainless, 303 (lb)	0.508	Pipe, Black, Buttweld (100 ft)	18.894
Bars, H.R., Carbon	6.075	Pipe, Galv., Buttweld (100 ft)	22.344
		Pipe, Line (100 ft)	190.108
		Casing, Oil Well, Carbon (100 ft)	185.566
		Casing, Oil Well, Alloy (100 ft)	288.980
Tubes, Boiler (100 ft)	46.737	Black Plate, Canmaking Quality (95 lb base box)	7.583
Tubing, Mechanical, Carbon (100 ft)	23.713	Wire, Drawn, Carbon	9.775
Tubing, Mechanical, Stainless, 304 (100 ft)	197.663	Wire, Drawn, Stainless, 430 (lb)	0.630
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783	Bale Ties (bundle)	7.423
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483	Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	8.377
		Woven Wire Fence (20-rod roll)	20.560

STEEL's FINISHED STEEL PRICE INDEX*

	June 5 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	228.59	228.59	228.59	210.45	171.92
Index in cents per lb	6.193	6.193	6.193	5.701	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$140.24	$140.24	$140.24	$128.98	$106.32
No. 2 Fdry Pig Iron, GT	64.70	64.70	64.70	60.27	52.54
Basic Pig Iron, GT	64.23	64.23	64.23	59.80	52.16
Malleable Pig Iron, GT	65.77	65.77	65.77	61.27	53.27
Steelmaking Scrap, GT	52.33	47.00	44.33	46.17	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	June 5 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.365	5.365	5.365	4.93	4.252
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	5.00	3.93
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.85	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, 7/32-5/8" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton	June 5 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$65.50	$65.50	$65.50	$61.00	$53.00
Basic, Valley	64.50	64.50	64.50	60.00	52.00
Basic, deld., Phila.	68.38	68.38	68.38	63.76	56.75
No. 2 Fdry, Neville Island, Pa.	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, Chicago	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, deld., Phila.	68.88	68.88	68.88	64.26	57.25
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	65.00	65.00	65.00	60.50	52.50
Malleable, Chicago	65.00	65.00	65.00	60.50	52.50
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	215.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$51.00	$46.50	$44.50	$44.50	$44.00
No. 1 Heavy Melt, E. Pa.	56.50	52.00	49.00	48.00	42.50
No. 1 Heavy Melt, Chicago	49.50	42.50	39.50	46.00	42.50
No. 1 Heavy Melt, Valley	52.50	48.50	41.50	49.50	44.00
No. 1 Heavy Melt, Cleve.	49.50	45.50	38.50	47.50	43.00
No. 1 Heavy Melt, Buffalo	40.50	40.50	41.50	45.50	43.00
Rails, Rerolling, Chicago	62.50	61.50	56.50	69.50	52.50
No. 1 Cast, Chicago	46.50	42.50	39.50	45.50	49.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry., Connlsvl.	18.00	18.00	18.00	16.50	17.50

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Steel Prices

Mill prices as reported to STEEL, June 5, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 256; to footnotes, page 258.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)
Detroit S41 .....$74.00
Houston S5 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$74.00
Bridgeport,Conn. NN19 ..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 ....80.00
Munhall,Pa. U5 .....74.00
S.Chicago,Ill. R2, U5 .74.00
S.Duquesne,Pa. U5 ....74.00
Sterling,Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$91.50
Bridgeport,,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 ....91.50
Houston S5 .....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2 ..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ...101.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$107.00
Bridgeport,Conn. N19..107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit S41 .....107.00
Fontana,Calif. K1 ...128.00
Gary,Ind. U5 .....107.00
Houston S5 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2.107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ..107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland,O. R2 .....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2,W14.111.50
S.Duquesne,Pa. U5 ..111.50

SKELP
Aliquippa,Pa. J5 ....4.725
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 .....4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ..4.625

WIRE RODS
AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston S5 .....6.05
IndianaHarbor,Ind. Y1 ..5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. S5 ....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ...6.05
Monessen,Pa. P17 .....5.80
N.Tonawanda,N.Y. B11 .5.80
Pittsburg,Calif. C11 ....6.60
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ...5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....5.00
Atlanta A11 .....5.20
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.00
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 .....5.75
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston S5 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
Joliet,Ill. P22 .....5.00
KansasCity,Mo. S5 ....5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.65
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 .....5.75
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14.5.00
S.SanFrancisco B3 .....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 ....5.00

Wide Flange
Bethlehem,Pa. B2 .....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.90
IndianaHarbor,Ind. I-2 .5.25
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston S5 .....7.45
Ind.Harbor,Ind. I-2, Y1.7.35
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. S5 ....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 ....8.05
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.40
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..5.90
Munhall,Pa. U5 .....5.90
S.Chicago, Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky.(15) A10 ..4.85
Bessemer,Ala. T2 .....4.85
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 .....5.70
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ..4.95
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 ..5.60
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 ....5.05
Harrisburg,Pa. P4 .....5.80
Houston S5 .....4.95
Ind.Harbor,Ind. I-2, Y1 4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. A2 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14 4.85
SparrowsPoint,Md. B2 ..4.85
Sterling,Ill. N19 .....4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Youngstown R2, U5, Y1.4.85

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.20
Fontana,Calif. K1 .....7.00
Geneva,Utah C11 .....6.25
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron
Economy,Pa. B14 ....11.95

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 .....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston S5 .....7.35
Ind.Harbor,Ind. I-2, Y1..7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy
Aliquippa,Pa. J5 .....6.85
Claymont,Del. C22 .....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.60
Gary,Ind. U5 .....6.85
Houston S5 .....6.95
Ind.Harbor,Ind. Y1 ....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. A2 .....6.85
Pittsburgh J5 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES
Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 .....6.275
Ind.Harbor,Ind. I-2 ..5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 .....5.925

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ....5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.275
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ..5.075
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa.(9) U5 ....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ..5.825
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Houston(9) S5 .....5.325
Ind.Harbor(9) I-2, Y1..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ...5.075
LosAngeles(9) B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ....5.525
Niles,Calif. P1 .....5.775
N.T'wanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11.5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 .....5.825
Seattle B3, N14 .....5.825
S.Ch'c'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5..5.075
S.SanFran.,Calif.(9)B3 5.825
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ..5.45
Torrance,Calif.(9) C11 5.775
Youngstown(9) R2, U5 5.075

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.125
Bethlehem,Pa. B2 ....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit S41 .....6.125
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 .....6.125
Houston S5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.125
Johnstown,Pa. B2 ....6.125
KansasCity,Mo. S5 ....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
Pittsburgh J5 .....6.125
S.Chicago R2,U5,W14 ..6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....7.425
Bessemer,Ala. T2 .....7.425
Bethlehem,Pa. B2 ....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 ....8.125
Gary,Ind. U5 .....7.425
Houston S5 .....7.675
Ind.Harbor,Ind. Y1 ...7.425
Johnstown,Pa. B2 ....7.425
KansasCity,Mo. S5 ....7.675
Lackawanna,N.Y. B2 ..7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14.7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.225
Houston(9) S5 .....5.325
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ...5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill.(1) N15 ...5.075
Tonawanda,N.Y. B12 ...5.45

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.075
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SanFrancisco S7 .....5.95

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.45
KansasCity,Mo. S5 ....6.45
Pittsburgh J5 .....6.20
Youngstown U5 .....6.20

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
LosAngeles S30 .....11.10
LosAngeles P2 .....11.35
Monaca,Pa. S17 .....9.475
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....6.85
BeaverFalls,Pa. M12,R2.6.85
Birmingham C15 .....7.45
Bridgeport,Conn. N19 ..7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 .....6.85
Detroit B5, P17 .....7.05
Detroit S41 .....6.85
Donora,Pa. A7 .....6.85
Elyria,O. W8 .....6.85
FranklinPark,Ill. N5 ...6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13.6.85
Hartford,Conn. R2 .....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ....8.30
LosAngeles R2 .....8.75
LosAngeles P2 .....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ...6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4..6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 ....7.10
Putnam,Conn. W18 .....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 .....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..6.10

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 ....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....8.325
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 ...8.325
Detroit B5, P17 .....8.525
Detroit S41 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ...8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 ....8.325
Hammond,Ind. L2,M13 8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles S30 .....10.10
LosAngeles P2 .....10.20
Mansfield,Mass. B5 ....8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 ....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ...8.325

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.275
Birmingham C15 .....5.075
Bridgeport,Conn. N9 ..5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ...5.825

Fairfield,Ala. T2 .....5.075
Fairless,Pa. U5 .....5.225
Fontana,Calif. K1 ....5.775
Ft.Worth,Tex.(4) T4 ..5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.775
Pittsburg,Calif. C11 ...5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.825
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 .....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint, Md. B2.5.075
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ..5.65
Torrance,Calif. C11 ...5.775
Youngstown R2, U5 ...5.075

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.30
Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 ....7.00
Lackawanna,N.Y. B2 ..6.50
Marion,O. P11 .....6.70
NewYork U8 .....7.20
Pittsburgh J5, U8 ....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4)(44) I-2 5.075
ChicagoHts.(4) C2 ....5.075
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 ....5.10
Franklin,Pa.(4) F5 ...5.075
JerseyShore,Pa.(4) J8 ..5.10
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 ....5.15
Tonawanda(4) B12 ....5.65
Williamsport,Pa.(3) S19.5.15

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14, 16.80
McK.Rks (S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt) L5 19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ...4.675
Cleveland J5, R2, ...4.675
Conshohocken,Pa. A3 ..4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Geneva, Utah C11 .....4.775
GraniteCity,Ill.(8) G4..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ...4.675
Niles,C. M21 .....4.675
Pittsburg,Calif. C11 ...5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ...4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown U5, Y1 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2.....6.90
Conshohocken,Pa. A3 ..6 95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 ....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1.6.90
Irvin,Pa. U5.....6.90
Lackawanna(35) B2 ...6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 .....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ...5.80
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1.5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middeltown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 .....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1.8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2.8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.65	6.90
Canton,O. R2	....6.65	7.15
Fairfield T2	.....6.65	6.90
Gary,Ind. U5	.....6.65	6.90
GraniteCity,Ill. G4	6.85	...
Ind.Harbor I-2	...6.65	6.90
Irvin,Pa. U5	.....6.65	6.90
Kokomo,Ind. C16	..6.75	...
MartinsFry. W10	..6.65	6.90
Pittsburgh J5	....6.65	...
Pitts.,Calif, C11	..7.40	...
SparrowsPt. B2	..6.65	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ....6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ....6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ...6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .....7.025

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 .....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)..8.95
Butler,Pa. A10 (type 2)..9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.35
Ind.Harbor,Ind. I-2 ...8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 .....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo.Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J.Bishop & Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division, Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Dawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U1 Universal-Cyclops Steel
U5 United States Steel Corp.
U5 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel&Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.675
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana Calif. K1	5.525
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. A2	7.75
Sharon Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPo'nt,Md. B2	6.95
Warren O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Evanston Ill. M22	6.85
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.70
FranklinPark,Ill. T6	6.95
Ind.Harbor Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.90
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.00
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.20	10.40	12.60	15.60	18.55
Boston T6	9.20	10.40	12.60	15.60	18.55
Bristol,Conn. W1	...	10.40	12.60	15.60	18.55
Carnegie Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	...	10.10	12.30	15.30	18.25
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
Detroit D2	8.75	10.20	12.40	15.40	....
Dover,O. G6	8.65	10.10	12.30	15.30	18.25
Evanston,Ill M22	8.65	10.10	12.30	....	....
FranklinPark,Ill. T6	8.75	10.10	12.30	15.30	18.25
Harrison,N.J. C18	...	....	12.60	15.60	18.55
Indianapolis C8	8.80	10.25	12.30	15.30	18.25
LosAngeles C1	10.85	12.30	14.50	....	....
NewBritain,Conn.(10) S15	8.65	10.10	12.30	15.30	18.25
NewCastle,Pa. B4, E5	8.65	10.10	12.30	15.30	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	8.65	10.10	12.30	15.30	....
New York W3	...	10.40	12.60	15.60	18.55
Pawtucket,R.I. N8	9.20	10.40	12.60	15.60	18.55
Riverdale,Ill. A1	8.75	10.10	12.30	15.30	18.25
Rome N.Y.(32) R6	8.65	10.10	12.30	15.30	18.25
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J R5	....	10.40	12.60	15.60	18.55
Wallingford,Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren,O. T5	8.65	10.10	12.30	15.30	18.25
Worcester,Mass. A7, T6	9.20	10.40	12.60	15.60	18.55
Youngstown C8	8.65	10.10	12.30	15.30	18.25

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	17.10	20.95	25.30
Buffalo W12	17.10	....	....
FranklinPark,Ill. T6	17.45	21.30	25.65
Harrison,N.J. C18	17.10	20.95	25.30
New York W3	17.10	20.95	25.30
Palmer Mass. W12	17.10	....	....
Trenton,N.J. R5	17.10	20.95	25.30
Worcester,Mass. A7, T6	17.10	20.95	25.30
Youngstown C8	17.45	21.30	25.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, C.R. Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Evanston,Ill. M22	6.95
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	...	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	....	11.525	12.575	13.55
Granite City,Ill. G4	9.40*	10.55*	11.225*†	12.275*	....
Indiana Harbor,Ind. I-2	9.20†	10.35*	11.025*†	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*†	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	..	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala.T2,	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85
Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity Ill. G4	7.60
Ind.Harbor,Ind. Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated Base Box)	
Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)	
Gary,Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. MS	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.90
Buffalo W12	11.90
Cleveland A7	11.90
Donora,Pa. A7	11.90
Duluth A7	11.90
Johnstown,Pa. B2	11.90
Minnequa,Colo. C10	12.025
Monessen,Pa. P16	11.90
Muncie,Ind. I-7	12.10
NewHaven,Conn. A7	12.20
Palmer,Mass. W12	12.20
Pittsburg Calif. C11	12.70
Portsmouth,O. P12	11.90
Roebling,N.J. R5	12.20
SparrowsPt.,Md. B2	12.00
Struthers,O. Y1	11.90
Trenton,N.J. A7	12.20
Waukegan,Ill. A7	11.90
Worcester,Mass. A7	12.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.70
Alton,Ill. L1	8.90
Buffalo W12	8.70
Cleveland A7	8.70
Donora,Pa. A7	8.70
Duluth A7	8.70
Johnstown,Pa. B2	8.70
KansasCity,Mo. S5	8.95
Minnequa,Colo. C10	8.90
LosAngeles B3	9.65
Monessen,Pa. P7, P16	8.70
NewHaven,Conn. A7	9.00
Palmer,Mass. W12	9.00
Pittsburg,Calif. C11	9.65
Portsmouth,O. P12	8.70
Roebling,N.J. R5	9.00
S.Chicago,Ill. R2	8.70
S.SanFrancisco C10	9.65
SparrowsPt.,Md. B2	8.80
Struthers,O. Y1	8.70
Trenton,N.J. A7	9.00
Waukegan,Ill. A7	8.70
Worcester,Mass. A7	9.00

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	9.025
Alton,Ill. L1	9.225
Bartonville,Ill. K4	9.125
Buffalo W12	9.025
Cleveland A7	9.025
Donora,Pa. A7	9.025
Duluth A7	9.025
Fostoria,O. S1	9.075
Johnstown,Pa. B2	9.025
LosAngeles B3	9.975
Milbury,Mass.(12) N6	9.325
Minnequa,Colo. C10	9.275
Monessen,Pa. P7, P16	9.025
Muncie,Ind. I-7	9.225
Palmer,Mass. W12	9.325
Pittsburg,Calif. C11	9.975
Portsmouth,O. P12	9.025
Roebling,N.J. R5	9.325
S.Chicago,Ill. R2	9.025
S.SanFrancisco C10	9.975
SparrowsPt.,Md. B2	9.125
Struthers,O. Y1	9.025
Trenton,N.J. A7	9.325
Waukegan,Ill. A7	9.025
Worcester J4, T6, W12	9.325
Worcester,Mass. A7	9.325

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.65
Bartonville,Ill. K4	14.25
Buffalo W12	14.45
Chicago W13	14.45
Cleveland A7	14.45
Crawfordsville,Ind. MS	14.25
Fostoria,O. S1	14.45
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.45
Kokomo,Ind. C16	14.45
Monessen,Pa. P7	14.45
Muncie,Ind. I-7	14.65
Palmer,Mass. W12	14.75
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.80
Waukegan,Ill. A7	14.45
Worcester,Mass. A7, T6	14.75

ROPE WIRE

Bartonville,Ill. K4	12.00
Buffalo W12	12.00
Fostoria,O. S1	12.00
Johnstown Pa. B2	12.00
Monessen,Pa. P7	12.00
Muncie,Ind. I-7	12.20
Palmer,Mass. W12	12.30
Portsmouth,O. P12	12.00
Roebling,N.J. R5	12.30
SparrowsPt.,Md., B2	12.10
Struthers,O. Y1	12.00
Worcester,Mass. J4	12.30

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.75
Monessen,Pa. P16	15.45
Roebling,N.J. R5	16.10

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Chicago W13	10.85
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	11.05
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	164
Aliquippa,Pa. J5	164
Atlanta A11	166
Bartonville,Ill. K4	166
Crawfordsville,Ind. M8	166
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jacksonville,Fla.(20) M8	175
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
KansasCity,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. P7	164
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill.(7) N15	166
Worcester,Mass. A7	170

NAILS, Stock

	Col.
Chicago W13	164
Cleveland A9	170

(To Wholesalers per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$9.82
Atlanta A11	9.63
Bartonville,Ill. K4	9.63
Buffalo W12	9.82
Chicago W13	9.82
Crawfordsville,Ind. M8	9.63
Donora,Pa. A7	9.82
Duluth A7	9.82
Fairfield,Ala. T2	9.82
Houston S5	10.07
Jacksonville,Fla. M8	10.09
Johnstown,Pa. B2	9.82
Joliet,Ill. A7	9.82
KansasCity,Mo. S5	10.07
Kokomo,Ind. C16	9.92
LosAngeles B3	10.61
Minnequa,Colo. C10	10.07
Pittsburg,Calif. C11	10.60
S.Chicago,Ill. R2	9.82
S.SanFrancisco C10	10.60
SparrowsPt.,Md. B2	9.92
Sterling,Ill.(37) N15	9.82

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.15
Atlanta A11	9.95
Bartonville,Ill. K4	9.95
Buffalo W12	10.15
Chicago W13	10.15
Crawfordsville,Ind. M8	9.95
Donora,Pa. A7	10.15
Duluth A7	10.15
Fairfield,Ala. T2	10.15
Houston S5	10.40
Jacksonville,Fla. M8	10.41
Johnstown,Pa. B2	10.15
Joliet,Ill. A7	10.15
KansasCity,Mo. S5	10.40
Kokomo,Ind. C16	10.25
LosAngeles B3	10.95
Minnequa,Colo. C10	10.40
Pittsburg,Calif. C11	10.95
S.Chicago,Ill. R2	10.15
S.SanFrancisco C10	10.95
SparrowsPt.,Md. B2	10.25
Sterling,Ill.(37) N15	10.15

Coil Interim

AlabamaCity,Ala. R2	$10.20
Atlanta A11	10.00
Bartonville,Ill. K4	10.00
Buffalo W12	10.20
Chicago W13	10.20
Crawfordsville,Ind. M8	10.00
Donora,Pa. A7	10.20
Duluth A7	10.20
Fairfield,Ala. T2	10.20
Houston S5	10.46
Jacksonville,Fla. M8	10.46
Johnstown,Pa. B2	10.20
Joliet,Ill. A7	10.20
KansasCity,Mo. S5	10.45
Kokomo,Ind. C16	10.30
LosAngeles B3	11.00
Minnequa,Colo. C10	10.45
Pittsburg,Calif. C11	11.00
S.Chicago,Ill. R2	10.20
S.SanFrancisco C10	11.00
SparrowsPt.,Md. B2	10.30
Sterling,Ill. (37) N15	10.20

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	196
Atlanta A11	192
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	196
Duluth A7	196
Fairfield,Ala. T2	196
Houston S5	201
Jacksonville,Fla. M8	197
Joliet,Ill. A7	190
KansasCity,Mo. S5	201
Kokomo,Ind. C16	198
Minnequa,Colo. C10	201
Pittsburg,Calif. C11	220
S.SanFrancisco C10	220
Sterling,Ill. (7) N15	196
SparrowsPt.,Md. B2	198
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Sterling,Ill.(1) N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	184**
Aliquippa,Pa. J5	181§
Atlanta A11	190*
Bartonville,Ill. K4	190
Crawfordsville,Ind. M8	190
Donora,Pa. A7	184†
Duluth A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. S5	189**
Jacksonville,Fla. M8	195
Johnstown,Pa. B2	188*
Joliet,Ill. A7	184†
KansasCity,Mo. S5	189**
Kokomo,Ind. C16	186†
Minnequa,Colo. C10	189**
Monessen,Pa. P7	188*
Pittsburg,Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	184**
S.SanFrancisco C10	204**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(7) N15	190*

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	176**
Aliq'ppa,Pa. 9-14½ga.J2	179§
Atlanta A11	182*
Bartonville,Ill. K4	182
Crawfordsville,Ind. M8	182
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	181**
Jacksonville,Fla. M8	187
Johnstown,Pa.(43) B2	180*
Joliet,Ill. A7	176†
KansasCity,Mo. S5	181**
Kokomo,Ind. C16	178†
Minnequa,Colo. C10	181**
Monessen,Pa. 9 ga. P7	180*
Pittsburg,Calif. C11	199†
Rankin,Pa. A7	176†
S. Chicago,Ill. R2	176**
Sterling,Ill.(7) N15	182*

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	16.00	17.55**
Aliq'ppa,Pa. J5	15.70	17.50
Bartonville K4	15.80	17.75
Cleveland A7	16.00	....
Crawf'dsville M8	15.80	17.75
Fostoria,O. S1	16.50	18.05†
Houston S5	16.25	17.80**
Jacksonville M8	16.05	18.00
Johnstown B2	16.00	17.95*
Kan.City,Mo. S5	16.25	....
Kokomo C16	16.10	17.65†
Minnequa C10	16.25	17.80*
P'lm'r,Mass.W12	16.30	17.85†
Pitts.,Calif. C11	16.35	17.90†
SparrowsPt. B2	16.10	18.05*
Sterling(37) N15	16.00	17.95*
Waukegan A7	16.00	17.55†
Worcester A7	16.30	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	8.20	8.75**
Aliquippa J5	7.95	8.475§
Atlanta (48) A11	8.05	8.65*
Bartonville(48) K4	8.05	8.65
Buffalo W12	8.20	8.75†
Cleveland A7	8.20	....
Crawfordsville M8	8.05	8.65
Donora,Pa. A7	8.20	8.75†
Duluth A7	8.20	8.75†
Fairfield T2	8.20	8.75†
Houston(48) S5	8.45	9.00**
Jacks'ville,Fla. M8	8.30	8.90
Johnstown B2(48)	8.20	8.95*
Joliet,Ill. A7	8.20	8.75†
Kans.City(48) S5	8.45	9.00**
Kokomo C16	8.30	8.85†
LosAngeles B3	9.15	9.90*
Minnequa C10	8.45	9.00‡
Monessen P7(48)	7.95	8.55*
Palmer,Mass. W12	8.50	9.05†
Pitts.,Calif. C11	9.15	9.70†
Rankin,Pa. A7	8.20	8.75†
S.Chicago R2	8.20	8.75**
S.SanFran. C10	9.15	9.70*
Spar'wsPt. B2(48)	8.30	9.05*
Sterling(37)(48)N15	8.35	9.10
Struth'rs,O.(48)Y1	8.20	8.85‡
Worcester,Mass.A7	8.50	9.05†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	52.5
Longer than 6 in.	43.5
⅝ in. thru 1 in:	
6 in. and shorter	43.5
Longer than 6 in.	41.5
1⅛ in. and larger:	
All lengths	41.5
Undersized Body (rolled thread)	
½ in. and smaller:	
6 in. and shorter	52.5

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	32.0
Longer than 6 in.	19.0
⅝ in. thru 1 in.:	
6 in. and shorter	16.0
Longer than 6 in.	16.0
1⅛ in. and larger:	
All lengths	16.0

Lag Bolts

All diameters:	
6 in. and shorter	52.5
Longer than 6 in.	44.5

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	52.0
Larger than ½ in. or longer than 6 in.	44.5

Blank Bolts 44.5
Step, Elevator, Tire Bolts 52.0
Stove Bolts, Slotted

⅛ to ¼-in. incl., 3 in. and shorter	54.00
⅝ to ½-in., inclusive	54.00

NUTS

Reg. & Heavy Square Nuts:
All sizes 58.0
Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 44.0
Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller	61.5
⅞ in. to 1 in., incl.	57.5
1⅛ in. to 1½ in., incl.	62.5
1⅝ in. and larger	56.0

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller	48.0
⅞ in. to 1 in., incl.	44.0
1⅛ in. to 1½ in., incl.	49.0

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	64.00
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

Semifinished Hex Nuts, Reg. (Including Slotted):

⅝ in. and smaller	61.5
¾ in. to 1-in., incl.	64.0
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)
Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	44.0
¾, ⅞ and 1 in. diam.	27.0
Longer than 6 in.:	
⅝ in. and smaller	14.0
¾, ⅞ and 1 in. diam.	0.5

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	31.0
¾, ⅞ and 1 in. diam.	9.0
Longer than 6 in.:	
⅝ in. and smaller	+6
¾, ⅞ and 1 in. diam.	+24

Flat Head Capscrews:
¾ in. and smaller. +65.0
Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:

6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 11.50
7/8-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	23.54
1¼	13	....	29.07	23.36
1½	13	27.45	32.14	25.83
1¾	13	32.43	37.97	30.51
2	13	36.34	42.56	34.20
2¼	13	40.93	47.94	38.52
2¼	12	44.42	52.03	41.81
2½	12	48.94	57.31	46.05
2¾	12	52.99	62.05	49.88
3	12	56.51	66.18	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.275	5.175	5.225	6.25
Ensley,Ala. T2	5.275	5.175	....	6.25
Fairfield,Ala. T2	....	....	....	6.25
Huntington,W.Va. C15	....	....	....	6.25
Gary,Ind. U5	5.275	5.175	5.225	....
IndianaHarbor,Ind. I-2	5.275	5.175	5.225	....
Johnstown,Pa. B2	....	....	....(16)	6.25
Lackawanna,N.Y. B2	5.275	5.175	....	6.25
Minnequa,Colo. C10	5.275	5.175	....	6.75
Steelton,Pa. B2	5.275	5.175	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.275
Gary,Ind. U5	6.275
Ind.Harbor,Ind. I-2	6.275
Lackawanna,N.Y. B2	6.275
Minnequa,Colo. C10	6.275
Seattle B3	6.425
Steelton,Pa. B2	6.275
Torrance,Calif. C11	6.425

JOINT BARS

Bessemer,Pa. U5	6.60
Fairfield,Ala. T2	6.60
Ind.Harbor,Ind. I-2	6.60
Joliet,Ill. U5	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Steelton,Pa. B2	6.60

AXLES

Ind.Harbor,Ind. S13	8.35
Johnstown,Pa. B2	8.35

TRACK BOLTS, Untreated

Cleveland R2	13.85
KansasCity,Mo. S5	13.85
Lebanon,Pa. B2	13.85
Minnequa,Colo. C10	13.85
Pittsburgh P14	13.10
Seattle B3	14.35

SCREW SPIKES

Lebanon,Pa. B2	13.60
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.225
Ind.Harbor,Ind. I-2, Y1	9.225
KansasCity,Mo. S5	9.225
Lebanon,Pa. B2	9.225
Minnequa,Colo. C10	9.225
Pittsburgh J5	9.225
Seattle B3	9.725
S.Chicago,Ill. R2	9.225
Struthers,O. Y1	9.225
Youngstown R2	9.225

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.35c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+21.75	1.25	+16.5	3.75	+14	5.25	+12.5	5.25	+12.5	5	+12.75	7.5	+10.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+21.75	1.25	+16.5	3.75	+14	5.25	+12.5	5.25	+12.5	5	+12.75	7.5	+10.25
Youngstown Y1	+5.25	+21.75	1.25	+16.5	3.75	+14	5.25	+12.5	5.25	+12.5	5	+12.75	7.5	+10.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+21.75	1.25	+16.5	3.75	+14	5.25	+12.5	5.25	+12.5	5	+12.75	7.5	+10.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Alton, Ill. L1	....	....	....	....	....	....	7.25	+10	10.25	+6	13.75	+1.5	16.25	+0.25
Benwood, W. Va. W10	6.5	+22	+4.75	+30.25	+14.75	+39.25	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Butler, Pa. F6	7.5	+21	+3	+28.5	+12.5	+37	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+10	10.25	+6	13.75	+1.5	16.25	+0.25
Fontana, Calif. K1	....	....	....	....	....	....	3.75	+21	+0.75	+17	2.75	+12.5	5.25	+11.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+9	11.25	+5	14.75	+0.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Sharon, Pa. S4	6.5	+22	+4	+29.5	+13.5	+38	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Sparrows Pt., Md. B2	5.5	+23	+0.5	+30.5	+14.5	+39	7.25	+10	10.25	+6	13.75	+1.5	16.25	+0.25
Wheatland, Pa. W9	7.5	+21	+3	+28.5	+12.5	+37	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	....	....	....	....
Alton, Ill. L1	16.75	0.75	17.25	1.25	18.75	1.5	18.75	1.5	....	....	....	....
Benwood, W. Va. W10	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	10.25	+7.5	10.25	+7.5
Etna, Pa. N2	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	10.25	+7.5	10.25	+7.5
Fairless, Pa. N3	16.75	0.75	17.25	1.25	18.75	1.5	18.75	1.5	8.25	+9.5	8.25	+9.5
Fontana, Calif. K1	5.75	+10.25	6.25	+9.75	7.75	+9.5	7.75	+9.5	+2.75	+20.5	+2.75	+20.5
Indiana Harbor, Ind. Y1	17.75	1.75	18.25	2.25	19.75	2.5	19.25	2.5	9.25	+8.5	9.25	+8.5
Lorain, O. N3	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	....	....	....	....
Sharon, Pa. M6	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	0.75	17.25	1.25	18.75	1.5	18.75	1.5	8.25	+9.5	8.25	+9.5
Wheatland, Pa. W9	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	10.25	+7.5	10.25	+7.5
Youngstown R2, Y1	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	10.25	+7.5	10.25	+7.5

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless	Plates 5%	Plates Carbon Base 10%	15%	20%	Sheets Carbon Base 20%
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	....	....	4.170
18.25	4.25	1	4.75	....	....	2.385
18	4	2	9	....	....	2.755
18	4	2	....	....	....	1.845
18	4	1	....	....	....	1.680
9	3.5	....	....	....	....	1.275
13.5	4	3	....	....	....	1.945
13.75	3.75	2	5	....	....	2.325
6.4	4.5	1.9	....	5	....	1.185
6	4	3	....	6	....	1.430
1.5	4	1	....	8.5	....	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	64.50	65.00	65.50	66.00
Tonawanda,N.Y. W12	64.50	65.00	65.50	66.00
N.Tonawanda,N.Y. T9	....	65.00	65.50	66.00
Boston, deld.	75.79	76.29	76.79	....
Rochester,N.Y., deld.	67.52	68.02	68.52	....
Syracuse,N.Y., deld.	68.62	69.12	69.62	....
Chicago District				
Chicago I-3	64.50	65.00	65.00	65.50
S.Chicago,Ill. R2	64.50	....	65.00	....
S.Chicago Ill. Y1	64.50	65.00	65.00	....
S.Chicago,Ill. W14	64.50	....	65.00	65.50
Milwaukee, deld.	66.96	67.46	67.46	67.96
Muskegon,Mich., deld.	....	78.83	78.83	....
Cleveland District				
Cleveland R2, A7	64.50	65.00	65.00	65.50
Akron,O., deld.	67.62	68.12	68.12	68.62
Mid-Atlantic District				
Birdsboro,Pa. B10	66.50	67.00	67.50	68.00
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	66.50	67.00	67.50	68.00
New York deld.	....	73.20	73.70	....
Newark,N.J., deld.	70.52	71.02	71.52	72.02
Philadelphia, deld.	68.38	68.88	69.38	69.88
Troy,N.Y. R2	66.50	67.00	67.50	68.00
Pittsburgh District				
NevilleIsland, Pa. P6	64.50	65.00	65.00	65.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	66.45	66.45	66.98
McKeesRocks,Pa., deld.	....	66.10	66.10	66.63
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld.	....	66.76	66.76	67.29
Verona,Trafford,Pa., deld.	66.79	67.32	67.32	67.85
Brackenridge,Pa., deld.	67.10	67.60	67.60	68.13
Midland,Pa. C18	64.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	65.00	....
Sharpsville,Pa. S6	64.50	....	65.00	65.50
Youngstown Y1	....	....	65.00	65.50
Mansfield,O., deld.	69.40	....	69.90	70.40
Duluth I-3	64.50	65.00	65.00	65.50
Erie,Pa. I-3	64.50	65.00	65.00	65.50
Everett,Mass. E1	66.00	66.50	67.00	....
Fontana,Calif. K1	72.50	73.00	....	....
Geneva,Utah C11	64.50	65.00	....	....
GraniteCity, Ill. G4	66.40	66.90	67.40	....
Ironton,Utah C11	64.50	65.00	....	....
Minnequa,Colo. C10	66.50	67.00	67.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	64.50	65.00	65.00	65.50
Cincinnati, deld.	71.04	71.54	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	77.25
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max frgt allowed up to $9. K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy N.Y. R2 (Phos. 0.035% max)	72.50
Philadelphia, deld.	80.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	69.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS			STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††		Carbon	Floor
Atlanta	8.17§	9.37§	9.83§	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.31	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	10.12	....	8.20	8.16	10.31
Boston	8.84	9.88	9.24	60.42	8.89	9.07	....	14.69	9.10	9.18	10.68
Buffalo	7.85	9.00	10.68	....	8.05	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	7.78	9.00	9.65	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.65	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.55	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.70	11.30	12.49	....	9.80	9.95	10.65	18.89	9.80	9.70	11.40
Detroit	8.03	9.25	10.00	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	7.85	9.00	9.60[10]	....	7.95	8.20	8.70[10]	....	8.50	8.35	9.75
Houston	8.80	9.75	10.99	....	7.75	8.05	9.15	15.00	8.00	8.80	10.30
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.10	12.30	11.25	57.45	9.15	9.20	12.10	15.50	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.93	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.13	9.35	10.05	....	8.17	8.42	8.70	....	8.55	8.51	....
New York	8.45	9.66	10.21	60.20	8.90	9.01	....	14.59	8.91	9.01	10.31
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	50.69	8.82	8.71	9.31	14.51	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.00	50.00	7.92	8.07	8.60	14.15	8.20	8.16	9.49
Portland, Oreg.	9.20	11.20	11.55	55.20	11.05‡‡	9.35	13.80	14.60	9.35	9.00	12.20
Richmond, Va.	8.00	....	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.16	73.36	8.19	8.43	8.96	14.51	8.67	8.52	9.86
St. Paul	8.39	9.59	10.26	....	8.43	8.68	9.21	....	8.94	8.90	10.10
San Francisco	9.05	10.95	10.90	53.45	9.05	9.15	12.40	15.60	9.15	9.30	11.55
Seattle	9.55	10.70	11.65	55.20	9.55	9.50	13.40	15.85	9.35	9.30	11.79
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.50	13.40	16.60	9.35	9.30	11.70
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 11.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **⅛-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle; 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [8]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Philadelphia, $137; Woodbridge, N.J., $135.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $100; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield. Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜-in. grains with fines: Baltimore, $72.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60% $33-$36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34-$35; Mexican, all-rail, duty paid, $27-$27.75; barge, Brownsville, Tex., $27.75-$29.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi river, ocean bags 23,000 lb and over..	10.50
F.o.b. Riverton or Camden, N.J., west of Mississippi river.	9.50
Sponge Iron, domestic, 98 + % Fe: Deld. east of Mississippi river, 23,000 lb and over	10.50
F.o.b. Riverton, N.J., west of Mississippi river	9.50
Sponge Iron, Canadian: F.o.b. shipping point	9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	26.00
Annealed, 99.5% Fe..	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 99.00-290.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500 lb drum, frght allowed Carlots	38.20
Ton lots	40.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	*34.30-43.00†*
Bronze, 5000-lb lots	52.80-57.20†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh ...	64.00
Minus 100 mesh ...	70.00
Minus 200 mesh ...	75.00
Nickel, unannealed ...	$1.065
Nickel-Silver, 5000-lb lots	*52.90-57.20†*
Phosphor-Copper, 5000-lb lots	62.00
Copper (atomized) 5000-lb lots	44.50-52.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304 ..	$1.08
Stainless Steel, 316 ..	$1.44
Tin	14.50*
Zinc, 5000-lb lots	*18.50-31.70‡*
Tungsten: Melting grade, 99% 60 to 2000 mesh: 1000 lb and over	Dollars 4.00
Less than 1000 lb ..	4.15
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam.	Inches Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5½	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$7.13*	*$7.13*	*$7.13*	*$7.36*
Bar Size Angles	*6.77*	*6.77*	*6.77*	*7.00*
Structural Angles	*6.77*	*6.77*	*6.77*	*7.00*
I-Beams	*7.17*	*7.17*	*7.17*	*7.41*
Channels	*7.17*	*7.17*	*7.17*	*7.41*
Plates (basic bessemer)	9.00	9.00	9.00	9.30
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	*26.62*	*26.62*	*26.62*	*27.77*
Barbed Wire (†)	*6.95*	*6.95*	*6.95*	*7.40*
Merchant Bars	6.95	6.95	6.95	7.30
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5.	6.72	6.72	6.72	7.12
Bright Common Wire Nails (§)	*8.38*	*8.38*	*8.38*	*8.58*

†Per 82-lb. net, reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic concentrates	62-64% 25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$23.00-24.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$55.00-58.00
48% 2.8:1	52.00-55.00
48% no ratio	46.00-48.00
South African Transvaal	
48% no ratio	$40.00-41.00
44% no ratio	30.00-31.00
Turkish	
48% 3:1	$59.00-62.00
Domestic Rail nearest seller	
18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.10-3.60
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens..	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.80 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.	

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton: $255, Johnstown, Duquesne, Sheridan, Pa., Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMINUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lots 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31 less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13c per lb of contained Si. Packed c.l. 15.5c, ton lot 16.95c, less ton 18.6c, f.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices. **65% Ferrosilicon:** Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C. (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c per lb. f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk, 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17 Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max C 0.4% max). Contract, ton lot, 2" x D $5.10 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c. f.o.b. Niagara Falls, N. Y.; Freight allowed to St. Louis

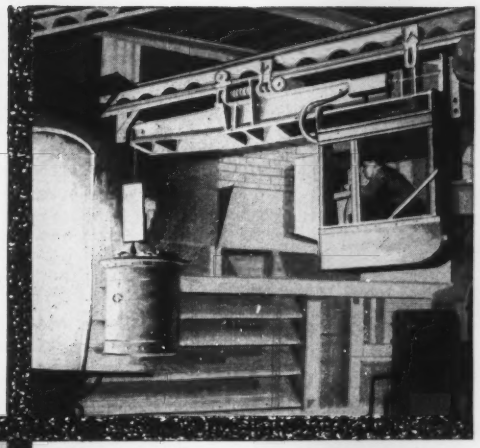
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b Niagara Falls, N. Y., freight allowed to St Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.



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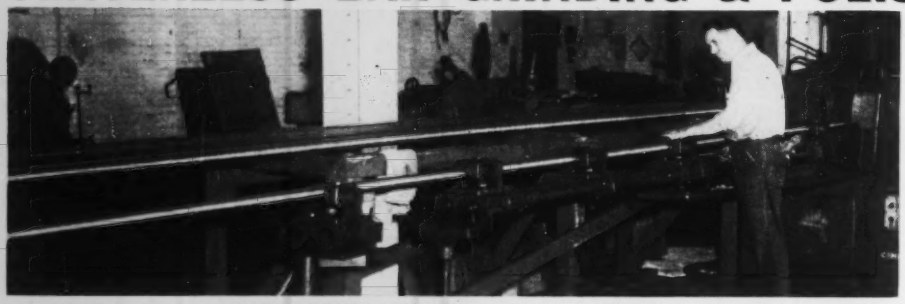

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Upswing in Scrap Continues

STEEL's index on the steelmaking grades rises $5.33 to $52.33, extending the recovery started six weeks ago. Shortage of supplies figures prominently in the advance

Scrap Prices, Page 266

Pittsburgh—Limited mill buying and a shortage of material (which is forcing brokers to bid up prices) are pushing scrap prices up sharply in this district. A mill in the area paid $51 for No. 1 heavy melting, while still another paid $45 for No. 2 heavy melting and $43 for No. 2 bundles. Factory bundles sold at $58, up $6 from the last buy. Railroad scrap is $2 to $3 a ton higher.

Philadelphia—Steel scrap prices have spurted upward. Exporters have been scouring the market for open-hearth material and domestic mills have been buying more actively in an effort to build inventories. Stocks at district dealers' yards have been low, with collections falling short of demand.

New York — The shortage of steel scrap has resulted in a further increase in brokers' buying prices. No. 1 heavy melting steel is now $50-$51, No. 2 heavy melting, $41-$42, No. 1 bundles, $50-$51, and No. 2 bundles, $40-$41.

Cleveland—New strength has developed in the market and is being reflected in a sharp upswing in prices here and in the Valley. The steelmaking grades are quoted $4 to $5 higher on buys by Valley mills. This strength has been communicated to the Cleveland market despite the absence of heavy local buying.

Chicago — Prices went up last week. While a $2 rise on the major grades seems to be a fair average, substantially larger increases are noted in a few items. Rerolling rail sales have been made at $68.

Detroit—No. 1 heavy melting steel is now quoted $43-$44, brokers' buying price. No. 2 is held at $33-$34, No. 1 bundles at $43-$44, No. 2 bundles at $33-$34, busheling at $43-$44, and punchings and plate scrap at $52-$53.

Buffalo—The scrap market here appears firm as June delivery contracts are awaited. Most dealers anticipate a price increase of around $2 a ton.

Cincinnati — Mill buying and scarcity of dealer scrap have sent the principal grades of steel scrap up $5 a ton. No. 1 heavy melting is being quoted $45-$46, brokers' buying price.

St. Louis—Scrap supplies are so scarce there are few transactions to confirm the higher prices quoted.

Birmingham—The scrap market here is active and strong. But its exact level is difficult to determine because of the variance in prices quoted by brokers.

Los Angeles—Prices are unchanged except for a few minor downward adjustments.

Seattle — The scrap market dropped $2 a ton last week, No. 1 heavy melting being quoted at $45 and No. 2 at $42. Other grades are off proportionately.

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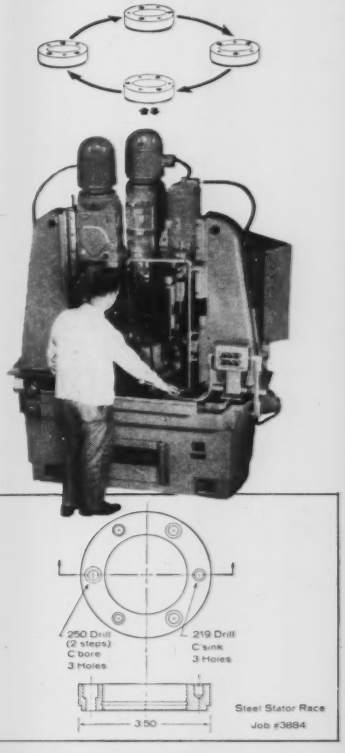

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, June 5, 1957. Changes shown in *italics*.

STEELMAKING SCRAP COMPOSITE

June 5	$52.33
May 29	47.00
Apr. Avg.	43.57
May 1956	50.34
May 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*51.00*
No. 2 heavy melting	*45.00-46.00*
No. 1 factory bundles	*57.00-58.00*
No. 1 dealer bundles	*51.00*
No. 2 bundles	*42.00-43.00*
No. 1 busheling	*51.00*
Machine shop turnings	*32.00-33.00*
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	*36.00-37.00*
Cast iron borings	*36.00-37.00*
Cut structurals, 3 ft lengths	51.00-52.00
Cut structurals, 2 ft and under	52.00-53.00
Heavy turnings	*44.00-45.00*
Punchings & plate scrap	51.00-52.00
Electric furnace bundles	51.00-52.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable cast	*44.00-45.00*
Unstripped motor blocks	34.00-35.00
No. 1 machinery cast	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*54.00-55.00*
Rails, 2 ft and under	*69.00-70.00*
Rails, 18 in. and under	*70.00-71.00*
Rails, random lengths	*63.00-64.00*
Railroad specialties	*62.00-63.00*

Stainless Steel Scrap

18-8 bundles & solids	300.00-310.00
18-8 turnings	190.00-210.00
430 bundles & solids	75.00-80.00
430 turnings	55.00-60.00

CLEVELAND

No. 1 heavy melting	*49.00-50.00*
No. 1 factory bundles	*54.00-55.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*49.00-50.00*
No. 2 bundles	*39.00-40.00*
No. 1 busheling	*49.00-50.00*
Machine shop turnings	20.00-21.00
Short shovel turnings	23.00-24.00
Mixed borings, turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut foundry steel	*49.00-50.00*
Cut structurals, plates 2 ft and under	*55.00-56.00*
Low phos. punchings & plate	*50.00-51.00*
Alloy free, short shovel turnings	26.00-27.00
Electric furnace bundles	*50.00-51.00*

Cast Iron Grades

No. 1 cupola	*52.00-53.00*
Charging box cast	*41.00-42.00*
Heavy breakable cast	*41.00-42.00*
Stove plate	*49.00-50.00*
Unstripped motor blocks	*34.00-35.00*
Brake shoes	*41.00-42.00*
Clean auto cast	*52.00-53.00*
Burnt cast	*39.00-40.00*
Drop broken machinery	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*54.00-55.00*
R.R. malleable	*61.00-62.00*
Rails, 2 ft and under	*73.00-74.00*
Rails, 18 in. and under	*74.00-75.00*
Rails, random lengths	*68.00-69.00*
Cast steel	*62.00-63.00*
Railroad specialties	*64.00-65.00*
Uncut tires	*62.00-63.00*
Angles, splice bars	*64.00-65.00*
Rails, rerolling	*71.00-72.00*

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	300.00-310.00
18-8 turnings	200.00-210.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*52.00-53.00*
No. 2 heavy melting	*44.00-45.00*
No. 1 bundles	*52.00-53.00*
No. 2 bundles	*42.00-43.00*
No. 1 busheling	*52.00-53.00*
Machine shop turnings	20.00-21.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	*55.00-56.00*
Electric furnace bundles	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*57.00-58.00*

CHICAGO

No. 1 hvy melt., indus.	*51.00-52.00*
No. 1 hvy melt., dealer	*47.00-48.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 factory bundles	*56.00-57.00*
No. 1 dealer bundles	*48.00-49.00*
No. 2 bundles	*37.00-38.00*
No. 1 busheling, indus.	*45.00-46.00*
No. 1 busheling, dealer	*43.00-44.00*
Machine shop turnings	*30.00-31.00*
Mixed borings, turnings	*33.00-34.00*
Short shovel turnings	*33.00-34.00*
Cast iron borings	*33.00-34.00*
Cut structurals, 3 ft.	49.00-50.00
Punching & plate scrap	50.00-51.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Stove plate	40.00-41.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	*55.00-56.00*
R.R. malleable	*56.00-58.00*
Rails, 2 ft and under	*66.00-67.00*
Rails, 18 in. and under	*67.00-68.00*
Angles, splice bars	*60.00-61.00*
Rails, rerolling	*62.00-63.00*

Stainless Steel Scrap

18-8 bundles & solids	310.00-315.00
18-8 turnings	210.00-215.00
430 bundles & solids	*70.00-75.00*
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	33.00-34.00
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*33.00-34.00*
No. 1 busheling	*43.00-44.00*
Machine shop turnings	23.00-24.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	25.00-26.00
Punchings & plate scrap	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	41.00
Stove plate	41.00
Heavy breakable	36.00
Unstripped motor blocks	28.00
Clean auto cast	48.00
Malleable	52.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	41.00
No. 2 heavy melting	37.00
No. 1 bundles	41.00
No. 2 bundles	32.00
No. 1 busheling	41.00
Machine shop turnings	25.00
Short shovel turnings	27.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	37.00
Heavy breakable cast	37.00
Unstripped motor blocks	37.00
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.25
Rails, 18 in. and under	*68.00*
Rails, rerolling	65.00
Rails, random lengths	*65.00*
Angles, splice bars	*60.00*

PHILADELPHIA

No. 1 heavy melting	*56.00-57.00†*
No. 2 heavy melting	*48.00-49.00*
No. 1 bundles	*58.00*
No. 2 bundles	*47.00*
No. 1 busheling	*58.00*
Electric furnace bundles	*58.00-59.00*
Mixed borings, turnings	*38.00†*
Short shovel turnings	*39.00-40.00*
Machine shop turnings	*37.50-38.00*
Heavy turnings	*52.00-53.00*
Structurals & plate	*58.00-60.00*
Couplers, springs, wheels	*63.00†*
Rail crops, 2 ft & under	*69.00-71.00*

Cast Iron Grades

No. 1 cupola	46.00
Heavy breakable cast	55.00
Malleable	62.00
Drop broken machinery	57.00-58.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*50.00-51.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*50.00-51.00*
No. 2 bundles	*40.00-41.00*
Machine shop turnings	*29.00-29.50*
Mixed borings, turnings	*29.00-29.50*
Short shovel turnings	*31.00-32.00*
Low phos. (structural & plate)	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Unstripped motor blocks	35.00-36.00
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips solids	*280.00-290.00*
18-8 borings, turnings	*180.00-190.00*
430 sheets, clips, solids	60.00-70.00
410 sheets, clips, solids	50.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	39.50-40.50
No. 2 heavy melting	29.50-31.00
No. 1 bundles	39.50-40.50
No. 2 bundles	28.00-29.00
No. 1 busheling	39.50-40.50
Machine shop turnings	23.00-24.00
Mixed borings, turnings	*25.00-25.50*
Short shovel turnings	26.00-26.50
No. 1 cast	34.00-35.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	42.00-43.00

BUFFALO

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	36.00-37.00
No. 1 bundles	40.00-41.00
No. 2 bundles	33.00-34.00
No. 1 busheling	40.00-41.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	29.00-30.00
Low phos.	46.00-47.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	41.00-42.00
No. 1 machinery	46.00-47.00

Railroad Scrap

Rails, random lengths	53.00-54.00
Rails, 3 ft and under	59.00-60.00
Railroad specialties	47.00-48.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*38.00-39.00*
No. 1 busheling	*45.00-46.00*
Machine shop turnings	*30.00-31.00*
Mixed borings, turnings	*28.00-29.00*
Short shovel turnings	*33.00-34.00*
Cast iron borings	*28.00-29.00*
Low phos. 18 in.	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	43.00-44.00
Heavy breakable cast	42.00-43.00
Charging box cast	42.00-43.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*47.00-48.00*
Rails, 18 in. and under	*67.00-68.00*
Rails, random lengths	*59.00-60.00*

BIRMINGHAM

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	*41.00-42.00*
No. 2 bundles	*29.00-30.00*
No. 1 busheling	*41.00-42.00*
Cast iron borings	*28.00-29.00*
Short shovel turnings	*35.00-36.00*
Machine shop turnings	*33.00-34.00*
Bar crops and plates	*51.00-52.00*
Structurals & plate	*50.00-51.00*
Electric furnace bundles	45.50-46.50
Electric furnace:	
3 ft and under	43.50-44.50
2 ft and under	44.50-45.50

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	49.00-50.00
Stove plate	49.00-50.00
Unstripped motor blocks	*41.00-42.00*
Charging box cast	34.00-35.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	*48.00-49.00*
Rails, 18 in. and under	*61.00-62.00*
Rails, rerolling	60.00-61.00
Rails, random lengths	*56.00-57.00*
Angles, splice bars	*57.00-58.00*

SEATTLE

No. 1 heavy melting	*45.00*
No. 2 heavy melting	*42.00*
No. 1 bundles	*42.00*
No. 2 bundles	*26.00*
Machine shop turnings	*28.00*
Mixed borings, turnings	*28.00*
Electric furnace No. 1	*52.00*

Cast Iron Grades

No. 1 cupola	*48.00*
Heavy breakable cast	*45.00*
Unstripped motor blocks	*37.50*
Stove plate (f.o.b. plant)	*37.00*

LOS ANGELES

No. 1 heavy melting	46.00
No. 2 heavy melting	43.00
No. 1 bundles	*45.00*
No. 2 bundles	33.00
Machine shop turnings	32.00
Shoveling turnings	*34.00*
Cast iron borings	*31.00*
Cut structural and plate, 1 ft and under	57.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*52.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*46.00*

SAN FRANCISCO

No. 1 heavy melting	48.00
No. 2 heavy melting	43.00
No. 1 bundles	47.00
No. 2 bundles	35.00
Machine shop turnings	32.00
Mixed borings, turnings	32.00
Cast iron borings	32.00
Heavy turnings	32.00
Short shovel turnings	34.00
Cut structurals, 3 ft	60.00

Cast Iron Grades

No. 1 cupola	53.00
Charging box cast	45.00-47.00
Stove plate	46.00
Heavy breakable cast	40.00
Unstripped motor blocks	48.00
Clean auto cast	55.00
No. 1 wheels	48.00
Drop broken machinery	53.00

HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	35.00
Mixed borings, turnings	19.00
Busheling, new factory:	
Prepared	43.00
Unprepared	37.00
Short steel turnings	30.00
Rails, rerolling	49.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

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Copper Sales Improve

While the domestic market remains off, foreign demand for the red metal continues to boom. The barter program is reinstated for lead and zinc, but users are still shy

Nonferrous Metal Prices, Pages 270 & 271

COPPER shipments to foreign countries are up.

Increased demand from England, Italy, Germany, France and Switzerland is helping to keep the market at current price levels (primary, 32 cents a pound; custom smelted, 30 cents a pound). Industry observers report that general business activity is holding up well in these foreign countries and that construction is at a peak. Crux: Builders in these areas use a high percentage of brass mill products.

Stateside—Most domestic users are still taking minimum tonnages from primary producers. But one sales executive reports: Orders are coming in a bit more frequently, indicating that inventories are low.

Outlook: Copper prices could go lower, but as long as domestic companies can sell their ores produced outside the U.S. to Europe, the odds will be against a further drop. (There is only one large U.S. copper company which does not have foreign mines.)

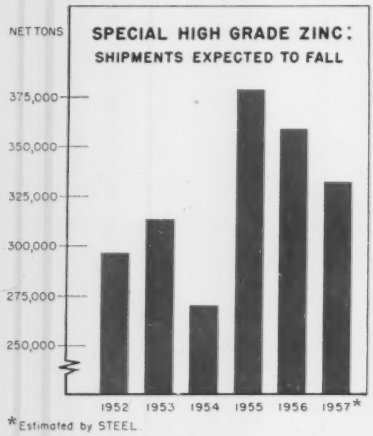
Tin Market Dull

The price of tin continues near the 98 cent a pound mark, but customers are few and far between. The British Board of Trade is expected to put some 2500 tons on the market this week (probably Tuesday, June 11). Industry analysts point out that big users will definitely sit on the sidelines until they see what effect the 2500 tons will have on the world price.

Zinc Price Cut Again

It has a few more restrictions, but the barter program (trading American surplus grain for foreign origin lead and zinc) has been reinstated. The Office of Defense Mobilization has committed itself to take more metal over the next several months for the supplemental stockpile.

Despite this action, the zinc price fell another half cent a pound late last week. At 11 cents, the price has tumbled 2½ cents a pound since May 6. Lead is expected to follow suit. Zinc sales are still affected by a lack of demand from the automotive and appliance industries. Special high grade, used in diecasting, may be the hardest hit this year (see chart).



*Estimated by STEEL.
Source: American Zinc Institute.

Aluminum: No Shortage

Some production cutbacks and a strike at Aluminium Ltd.'s Arvida, Que., smelter will have little effect on the market. There still is more than enough to go around.

Independent aluminum extruders and diecasters are going through one of their roughest periods. Consensus: If they can hang on until the fourth quarter, they should be able to weather any kind of economic storm.

Price Drop for Titanium

Titanium Metals Corp. of America, New York, has reduced prices an average of 10 per cent on these products: Titanium bars, billets, wire, plates, extrusions and nonalloy grades of sheets and strip.

Rundown: Commercially pure sheets and strip, down $1.50 a pound; plates, 50 cents to $1.25 a pound; bars, 95 cents a pound; billets, 85 cents a pound; wire, $1 a pound. Extrusions have been dropped $1.90 a pound; powder has been reduced from $10 to about $8 a pound.

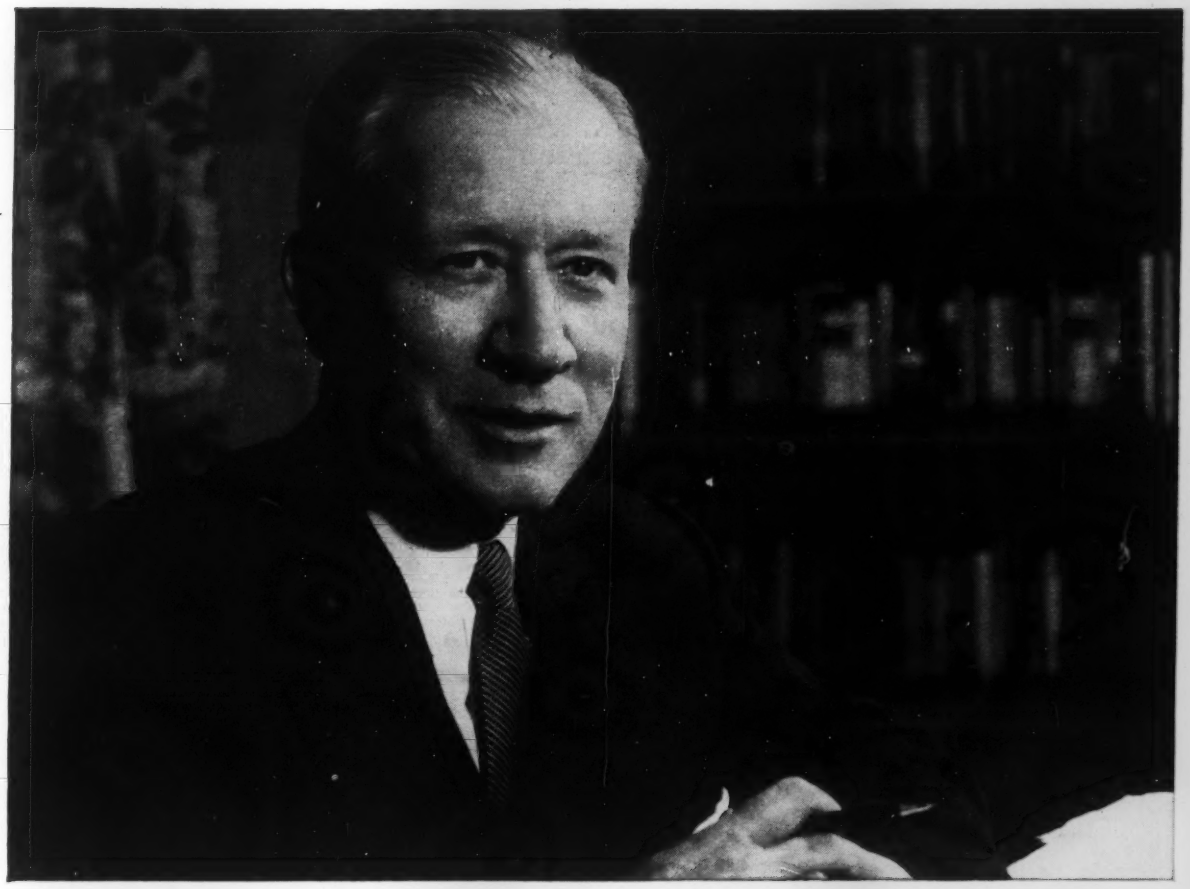
Market Memo

• Look for Gordon Gray, director, Office of Defense Mobilization, to demand an up-to-date survey on most critical metals. His first move will be a new nickel report which should prove there is no nickel shortage at the moment.

NONFERROUS PRICE RECORD

	Price June 5	Last Change	Previous Price	May Avg.	Apr. Avg.	June, 1956 Avg.
Aluminum	27.10	Aug. 10, 1956	25.90	27.100	27.100	25.900
Copper	30.00–32.00	May 9, 1957	30.50–32.00	31.087	31.598	43.000
Lead	14.80	May 16, 1957	15.30	15.185	15.800	15.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	33.750
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	98.50	June 4, 1957	98.375	98.341	99.276	94.611
Zinc	11.00	June 4, 1957	11.50	11.923	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.



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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 241, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100-lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley: 32.00 deld. Midwest; custom smelters, 30.00 deld.; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-110 nom. per troy oz.

Lead: Common, 14.80; chemical, 14.90; corroding, 14.90, St. Louis. New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 13 in. sticks, 59.00 f.o.b. Madison Ill.

Magnesium Alloys: AZ91B (die casting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-100 per troy oz, nom.

Palladium: $23-24 per troy oz.

Platinum: $90-95 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: 99.5%, $12-15 per lb.

Silver: Open market, 90.875 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Rod, $58.06 per lb; sheet, $45.36 per lb.

Tellurium: $1.60-1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N.Y., spot and prompt, 98.50.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.75; grade A-2 (0.5% Fe max.), $2.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.75.

Zinc: Prime Western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 12.35; special high grade, 12.75 deld. Die casting alloy ingot No. 3, 15.25; No. 2, 16.25; No. 5, 15.75 deld.

Zirconium: Sponge, commercial grade, $10 per lb.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.00-28.25, No. 12 foundry alloy (No. 2 grade), 21.00-22.00; 5% silicon alloy, 0.60 Cu max., 24.00-24.50; 13 alloy, 0.60 Cu max., 24.00-24.50; 195 alloy, 23.75-25.25; 108 alloy, 21.50-22.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.00; grade 3, 20.00; grade 4, 19.25.

Brass Ingot: Red brass, No. 115, 30.50; tin bronze, No. 225, 40.00; No. 245, 34.50; high-leaded tin bronze, No. 305, 34.50; No. 1 yellow, No. 405, 25.00; manganese bronze, No. 421, 28.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.83-1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $20.50 per cwt; pipe, full coils, $20.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-12.00; wire, $7.50-11.50; forging billets, $6.00-8.10; hot-rolled and forged bars, $6.15-8.40.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.00; plates, 19.50.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.50-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. width or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-Finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
Rolled				
1.125-1.500	55.20	53.90	59.00	56.10
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$18.45	2	$ 57.00
1	29.00	4	157.20
1½	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Thread plate, .188 in., 71.70; .250-2.00 in., 70.60. Tooling plates, .250-3.0 in., 73.0.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.00-13.50; old shets, 10.00-10.50; borings and turnings, 650-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	46.85	34.97d	47.39	49.76	21.250	21.000	19.375
Low Brass, 80%	49.80	49.74	50.34	52.61	23.750	23.500	23.000
Red Brass, 85%	50.84	50.78	51.38	53.65	24.750	24.500	24.000
Com. Bronze, 90%	52.43	52.42	53.02	55.04	25.750	25.500	25.500
Manganese Bronze	54.65	48.75	59.25	....	19.750	19.500	19.000
Muntz Metal	48.99	44.80	....	....	20.000	19.750	19.250
Naval Brass	50.91	45.22	57.97	54.32	19.750	19.500	19.000
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	63.56	65.89g	65.89	....	27.750	27.750	13.750
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

7.00; crankcases, 10.00-10.50; industrial castings, 10.00-10.50.

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 21.50-22.00; light copper, 19.75-20.25; No. 1 composition red brass, 20.00-20.50; No. 1 composition turnings, 19.50-20.00; yellow brass turnings, 11.50-12.00; new brass clippings, 18.00-18.50; light brass, 12.00-12.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 15.50-16.00; auto radiators, unsweated, 15.00-15.50; cocks and faucets, 16.50-17.00; brass pipe, 17.00-17.50.

Lead: Heavy, 10.50-11.00; battery plates, 5.75-6.00; linotype and stereotype, 12.75-13.25; electrotype, 12.25-12.75; mixed babbitt, 12.00-12.50.

Monel: Clippings, 45.00-48.00; old sheets, 45.00-48.00; turnings, 35.00-38.00; rods, 45.00-48.00.

Nickel: Sheets and clips, 80.00-90.00; rolled anodes, 80.00-90.00; turnings, 65.00-75.00; rod ends, 80.00-85.00.

Zinc: Old zinc, 3.00-3.50; new die-cast scrap, 2.75-3.50; old die-cast scrap, 1.50-2.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50; 3003 clippings, 16.50; 6151 clippings, 16.50; 5052 clippings, 16.00-16.50; 2014 clippings, 15.50-16.00; 2017 clippings, 15.50-16.00; 2024 clippings, 15.50-16.00; mixed clippings, 15.00; old sheets, 13.00-13.50; old cast, 13.00-13.50; clean old cable (free of steel), 15.50-16.50; borings and turnings, 13.50-14.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 26.75; No. 2 heavy copper and wire, 24.50; light copper, 22.25; refinery brass (60% copper) per dry copper content, 23.75.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 26.75; No. 2 heavy copper and wire, 24.50; light copper, 22.25; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 17.00; yellow brass turnings, 16.00; radiators, 17.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 101.50; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 116.50; 200-499 lb, 115.00; 500-999 lb, 114.50; 1000 lb or more, 114.00.

Zinc: Balls, 18.59; flat tops, 18.25; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.
Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 24.35; 200 lb, 21.35; 300 lb, 20.35; 400 lb, 19.85; 500 lb, 18.35; 2000 lb, 16.10; 6000 lb, 15.85; 12,000 lb, 15.60, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 77.40; 100-600 lb, 68.20; 700-1900 lb, 65.50; 2000-9900 lb, 63.60; 10,000 lb or more, 62.30.

Stannous Chloride (anhydrous): Less than 25 lb, 167.10; 25 lb, 132.10; 100 lb, 117.10; 400 lb, 114.70; 5200-19,600 lb, 102.50; 20,000 lb or more, 90.30.

Stannous Sulphate: Less than 50 lb, 129.80; 50 lb, 99.80; 100-1900 lb, 97.80; 2000 lb or more, 95.80.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

Electrical Engineers

● **Would you like** a job where your skill as a creative design man or an application engineer would be fully utilized?

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● **Would you like** to live in a city abounding in all types of sports and recreational activities, and famous as a place to bring up a family?

If you are an electrical engineer with experience in either the Maintenance or Electrical Engineering departments of a primary metal producing company, it will pay you to investigate this opportunity.

For details write to Box 557, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Readers of **STEEL** include men of wide training and experience in the various branches of the metalworking industry.
When you have an opportunity to offer, use the Help Wanted columns of STEEL.

CLASSIFIED

Help Wanted

CERAMIC ENGINEER WANTED
Ceramic Engineer to head complete ceramic laboratory. To supervise and run development tests. Preferably refractory specialties and fire brick experience. Some traveling for sales department will be necessary. Box 561, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALES ENGINEER EXPERIENCED IN DEVELOPING customers needing Welded Plate Steel Fabrications or Engineering services. Cleveland and Akron, Ohio primary territory. Reply to Personnel Dept., Lewis Welding & Engineering Corp., Bedford, Ohio.

Representatives Wanted

GROWING COMPANY LOCATED IN EASTERN Pennsylvania wants active representation in Western Pennsylvania and Eastern Ohio. Salesman should now be selling to Structural Steel Fabricators in above area. Our line can be carried along with non competitive items. Must be able to read structural and architectural prints. Commission basis. Address Box No. 559, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Positions Wanted" set solid. 50 words or less $15.00, each additional word .30, all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14 all capitals, 25 words or less $4.50, each additional word .18; all capital leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building Cleveland 13, Ohio.

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OR
2. Build and operate complete job galvanizing facilities in your city.
OR
3. Engineer and install modern, low-cost facilities to replace outmoded galvanizing operations.

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Galvanizing facilities to process 200 tons of job work per day

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for *fast racking and unloading small parts.* Handles variety of work. Reduces handling, eliminating wires, springs, etc. Economical—time saving. Replaceable units can be assembled in any spacing arrangement desirable. Made in aluminum and titanium. Write for circular.

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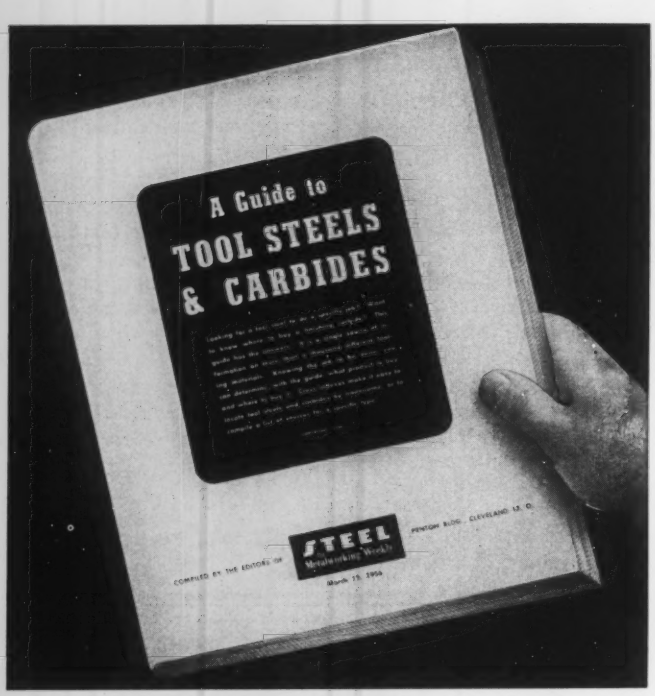
BLISS PRESS 175 TON
Serial No. 50085-1915-5474 is a straight sided, single crank, rebuilt press-bed 26½" x 28", stroke 16" with 6" adjustment, v-belt drive and 20 HP motor 3PH-60cy-220V. Price on car at Phila., Pa. $4600.00. Specialty Engineering Co., 3300 Frankford Ave., Philadelphia 34, Pa.



HERE'S HELP for your tooling problems

Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

40 PAGES

Copies of the Guide to Tool Steels & Carbides are available from Editorial Service, STEEL, Penton Bldg., Cleveland 13, O., at the following prices:

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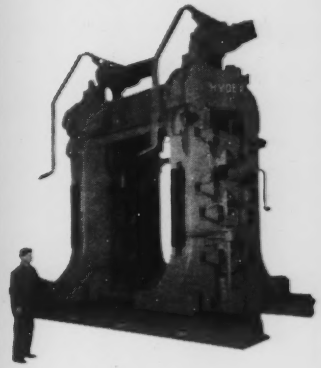
Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Rolling Mill Equipment

Outstanding in quality and in performance Hyde Park Rolling Mill Equipment has enjoyed the respect of the industry for more than fifty years.



Bar Mills
Merchant Mills
Sheet and Strip Mills
Pinion Stands
Roller Tables
Reduction Drives
Stretcher Levellers
Guillotine Shears
Sheet Mill Shears
Roll Lathes
Special Machinery
Machine Work

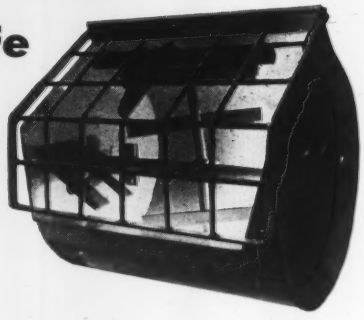
Hyde Park

FOUNDRY & MACHINE CO.

Hyde Park, Westmoreland County, Pa.

ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

How Mayari R lengthened the life of these mixer drums



Mixing mortar or terrazzo in a machine like this one puts the steel mixing drum through quite an ordeal. In earlier models the abrasive action of the batch against the drum walls caused excessive wearing of ordinary carbon-steel drums.

For longer drum life the Muller Machinery Co., Inc., of Metuchen, N. J., decided to utilize the superior abrasion-resistance of Mayari R steel. Now, using Mayari R sheet as heavy as 4-gage, they rotary-shear it, multiple-punch it, roll-form it, and weld it into a drum that outlasts the previous drums of carbon steel. And Mayari R has proved to be as readily workable and weldable as the steel they had used before.

Abrasion-resistance is by no means the only advantage to be gained in using Mayari R high-strength, low-alloy steel. Its high yield point permits designs of greater strength or lighter weight. It has 5 to 6 times more resistance to atmospheric corrosion than plain carbon steel, and holds paint up to 80 pct longer.

Catalog 353 covers the Mayari R subject in complete detail. A copy may be obtained promptly by writing to the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mayari R...High-Strength, Corrosion-Resisting Steel

BETHLEHEM STEEL

Apron hoist unit on ore unloader, consisting of single welded steel drum driven by electric motor flexibly-coupled to Cleveland Worm Gear Speed Reducer.

147 CLEVELANDS on 7 new unloaders help speed ore removal at Chicago docks

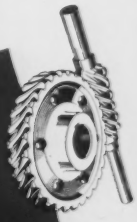
SEVEN new unloaders to speed up ore handling have been erected at United States Steel's South Works in Chicago. Ten-thousand to sixteen-thousand ton ore boats now enjoy turnaround rates averaging only seven to eight and one-half hours.

These new unloaders—three on the south dock and four on the north dock—are equipped with Cleveland Worm Gear Drives—21 speed reducers per unit, 147 in all.

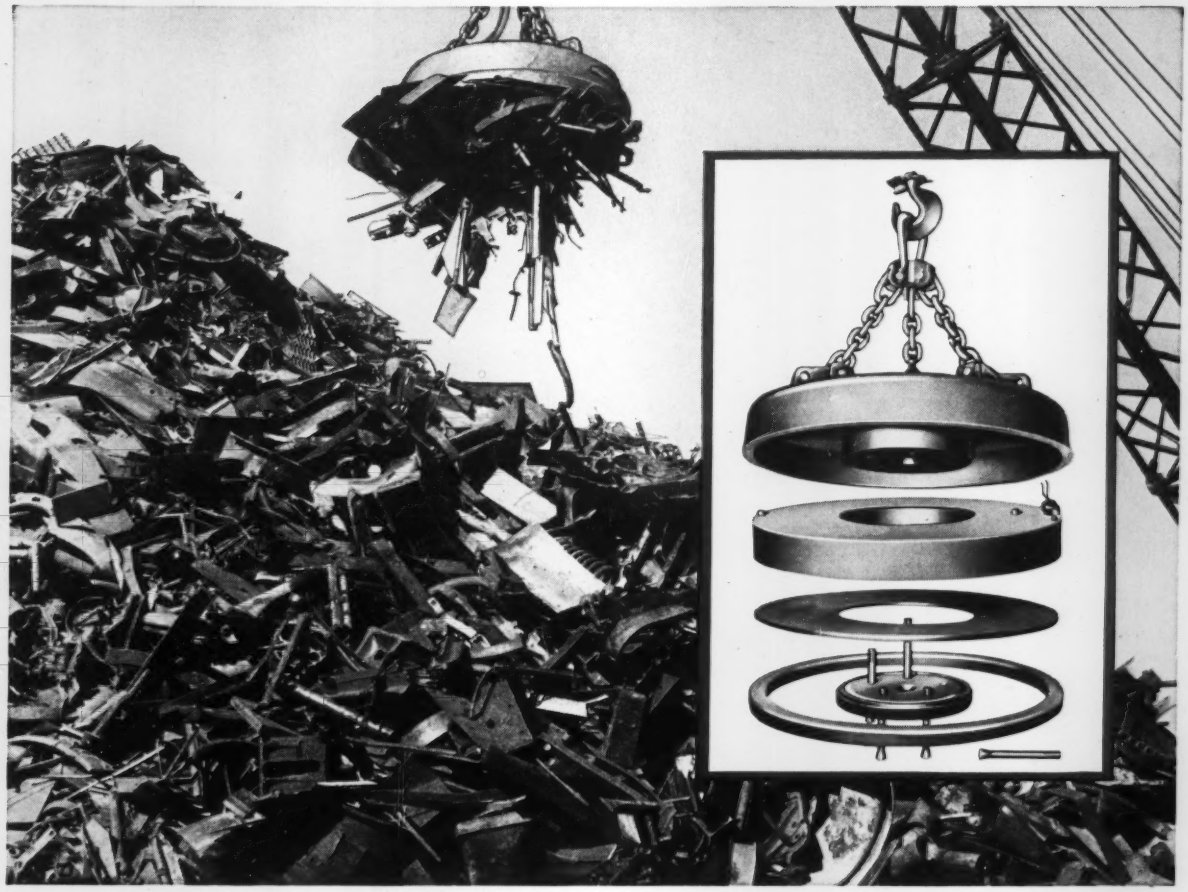
Wherever equipment has to perform dependably in rugged service, day in, day out, with minimum attention, builders and users alike choose Clevelands. For 45 years, Cleveland has concentrated its engineering and manufacturing facilities on making finest quality worm gearing to meet customers' most exacting requirements.

Write for new Bulletin 145 which shows standard and special design drives offered by Cleveland. The Cleveland Worm and Gear Co., 3270 E. 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers, Limited.



CLEVELAND
Worm Gear
Speed Reducers



This welded magnet can really make sense to you

The *coil* is welded into a capsule, removable and replaceable in the field

The outer pole shoe is welded to the body

And it all adds up to more copper, more lift, more life, more "no-trouble" periods.

Now available to you in a *better* welded design is the Cutler-Hammer Supermagnet . . . the magnet that has been "super" since it started. We say this is better because here welding makes sense. Welding is used to seal the coil into a compact, homogeneous, monolithic mass that is moisture proof and can be removed from the body on the job for repairs without trouble.

Welding is used to unite the cast dynamo steel body and the alloy steel outer pole shoe into a rugged, wear-resistant unit. On the other hand, this unit retains the uniformity of magnetic flux density between the inner and outer pole shoes that means more lifting power, a bigger "bite."

The coil shield has an improved and heavier cross section to better protect the coil. The inner pole shoe—which of all magnet parts gets most wear—is *NOT* welded but held in place by countersunk through bolts, so it can be easily removed and replaced.

You'll find other advantages too—the design of the lugs, the design of the cast steel chain yoke, the design of the terminal box: these are some of the features that make the "Supermagnet" super. Ask for new magnet book THE BIG LIFT. Shows the complete C-H line welded, bolted and special magnets. CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin.

CUTLER-HAMMER
SUPERMAGNETS
C-H